

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

UNITED STATES OF AMERICA, and the STATE OF DELAWARE,)	
Plaintiffs,)	
v.)	CIV. NO. _____
E.I. DU PONT DE NEMOURS AND COMPANY and CIBA SPECIALTY CHEMICALS CORPORATION)	
Defendants.)	CONSENT DECREE

I. INTRODUCTION

1. This Consent Decree is made and entered into by and among the United States of America (United States), on behalf of the Under Secretary for Oceans and Atmosphere of the National Oceanic and Atmospheric Administration (NOAA) acting on behalf of the Secretary of Commerce, the Secretary of the Department of the Interior (DOI) acting through the U.S. Fish and Wildlife Service (FWS), and the State of Delaware (State) through the Delaware Department of Natural Resources and Environmental Control (DNREC) (collectively, "the Trustees"); and E.I. du Pont de Nemours and Company and Ciba Specialty Chemicals Corporation (collectively, "DuPont").

2. The United States and the State have filed a complaint against DuPont seeking damages for injuries to natural resources, arising out of the releases of hazardous substances at manufacturing facilities, and adjacent waste disposal areas which received waste from the manufacturing facilities (hereinafter, "Plant Site"), owned, or formerly owned by E.I. du Pont de Nemours, and a portion of which is currently owned by Ciba Specialty Chemicals Corporation ("Ciba").

3. The Trustees have assessed injuries to natural resources resulting from Plant Site releases, focusing their investigation on an Assessment Area described below. The purpose of this Consent Decree is to fully and finally resolve Natural Resource Damage claims under section 107(a)(4)(c) and 107(f) of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9607 (a)(4)(c) and 9607(f) (hereinafter referred to as "CERCLA") and the Delaware Hazardous Substance Cleanup Act (hereinafter referred to as "HSCA)", 7 Del. C. Ch. 91 with respect to the Assessment Area.

II. BACKGROUND

4. The approximately 120 acre Assessment Area, located in New Castle Co., Delaware is adjacent to and contains a portion of the Christina River, a sub-watershed in the Delaware River Estuary. The Assessment Area is located near the I-95, I-495, and Delaware State 141 interchange and consists of a pigment manufacturing plant, a former chromium dioxide production facility (DuPont Holly Run Plant), two inactive landfills separated by the Christina River, a small recreational area (Ballpark), a segment of the Christina River and associated wetlands. Hazardous substances found at the Assessment Area include arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, silver, and zinc, all of which are

"hazardous substances" within the meaning of section 101(14) of CERCLA, 42 U.S.C. § 9601(14). The Assessment Area is the subject of the Damage Assessment and Restoration Plan (DARP) incorporated in this Consent Decree as Attachment A, and is depicted in the map attached to the Consent Decree as Attachment B.

5. E. I. Du Pont de Nemours purchased and operated an existing pigment manufacturing facility in 1929, and operated it until 1984 when it was acquired by Ciba. As part of the acquisition agreement, E. I. du Pont de Nemours agreed to indemnify Ciba for certain claims, including the claims in the Complaint. E. I. du Pont de Nemours continues to own the remainder of the Plant Site, and manufactured chromium dioxide powder at the Plant Site from 1978 until 1999.

6. In 1988, E. I. du Pont de Nemours entered into an Administrative Order on Consent (AOC) with the Environmental Protection Agency (EPA) to complete investigations for the Dupont Newport Superfund Site ("Superfund Site") in which the Assessment Area and Plant Site are located. The Superfund Site was included on the National Priorities List in early 1990. A Remedial Investigation/Feasibility Study (RI/FS) for the Superfund Site was conducted in three phases between August 1988 and 1992. In August 1993, a Record of Decision (ROD) was issued that specified remedial actions for seven operable units within the Superfund Site. A summary of the remedial actions undertaken pursuant to the ROD is included in the DARP.

7. Liability for damages to natural resources, pursuant to Section 107 of CERCLA, 42 U.S.C. §9607 shall be to the United States and the State for natural resources belonging to, managed by, controlled by, or appertaining to them. Liability for natural resources shall also be to the State pursuant to HSCA, 7 Del. C. Ch. 91. The United States and the State are authorized

to assess injuries to federal and state natural resources caused by releases of hazardous substances and to recover damages to: (1) restore, rehabilitate, replace or acquire the equivalent of the injured natural resources and (2) reimburse the Trustees for the reasonable costs of the damage assessment and restoration planning. All natural resource damage costs required to be paid under this Consent Decree are set forth in the "Summary of Costs" which is Attachment G to this Consent Decree.

8. The United States and the State share trusteeship of the injured resources in the Assessment Area. The Trustees determined that releases of hazardous substances to the wetlands, surface water, groundwater, sediments, and terrestrial habitats within the Assessment Area have resulted in injury to these natural resources, and that some of these injuries have continued post-remediation.

9. Pursuant to this Consent Decree, DuPont will (1) pay the costs for the Trustees to implement the projects in the DARP (Attachment A) to restore Assessment Area natural resources or their services; (2) purchase an Environmental Covenant from the landowner of private property outside the Assessment Area on which the restoration projects will be implemented (hereinafter "Pike Property"); (3) pay Damage Assessment Costs incurred by the Trustees; and (4) pay a damage claim to the State, and receive a credit from the State for prior work performed to extend access to a public water supply, as compensation for any remaining injuries to groundwater in the Assessment Area.

10. The Parties agree that the DARP and this Consent Decree represent a cooperative and collaborative process.

11. The Parties recognize, and the Court by entering this Consent Decree finds that this Consent Decree has been negotiated in good faith, that implementation of this Consent Decree will expedite the restoration of natural resources and will avoid prolonged and complicated litigation among the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.

THEREFORE, it is ORDERED, ADJUDGED AND DECREED as follows:

III. JURISDICTION AND VENUE

12. The Court has personal jurisdiction over the Parties and has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1345, and Sections 107 and 113(b) of CERCLA, 42 U.S.C. §§ 9607 and 9613(b) and HSCA, 7 Del. C. § 9105. Venue is proper in this Court pursuant to 28 U.S.C. § 1391(b) and Section 113(b) of CERCLA, 42 U.S.C. § 9613(b).

IV. PARTIES

13. The parties to this Consent Decree are the United States of America, on behalf of NOAA and DOI/FWS; the State of Delaware, on behalf of DNREC; and E. I. du Pont de Nemours and Company and Ciba Specialty Chemicals Corporation.

V. DEFINITIONS

14. Unless otherwise expressly provided herein, terms used in this Consent Decree which are defined in CERCLA, 42 U.S.C. § 9601 et seq., or in regulations promulgated under CERCLA, 43 C.F.R. Part 11 and 40 C.F.R. Part 300, shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree

or in the Attachments attached hereto and incorporated hereunder, the following definitions shall apply:

A. "Assessment Area" shall mean the area described in paragraph 4 above, depicted on the map attached to this Consent Decree as Attachment B, which is the subject of the restoration measures described in the DARP.

B. "Consent Decree" means this document entitled "Consent Decree," all attachments thereto, and any modifications made pursuant to Section XVII.

C. "Date of Entry" means the date on which this Consent Decree is entered by the Clerk of Court after the United States and the State have moved for entry and the District Court Judge has signed the Consent Decree.

D. "Date of Lodging" means the date that this Consent Decree is lodged with the Clerk of Court.

E. "Interest" shall mean interest accruing from the effective date of the Consent Decree, until the date of payment, at the rate set forth in 28 U.S.C. 1961. Interest shall be simple interest calculated on a daily basis;

F. "Parties" means the United States, the State, and DuPont.

G. "Damage Assessment Costs" means the costs incurred by the Trustees in assessing the natural resources actually or potentially injured, destroyed, or lost in the Assessment Area, and in identifying and planning for restoration actions to compensate for such injuries and losses. Such costs include administrative costs and other costs or expenses, direct and indirect, including but not limited to, the Trustee attorneys' costs incurred to support the assessment and restoration planning process.

H. "DARP" means the plan entitled "Damage Assessment and Restoration Plan, DuPont/Newport Assessment Area (and incorporated in this Consent Decree as Attachment A).

I. "Restoration Projects" shall mean the restoration actions comprised of, defined and described in the DARP (Attachment A).

J. "Superfund Site" shall mean the E.I./Newport Superfund Site which is the subject of the August 1993 ROD issued by EPA.

K. "Trustees" means for the United States - NOAA, DOI/FWS; and, for the State - DNREC.

L. "Natural Resource Damages" shall mean damages recoverable under section 107(a)(4)(c) and 107(f) of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9607 (a)(4)(c) and 9607(f) (hereinafter referred to as "CERCLA") and the Delaware Hazardous Substance Cleanup Act (hereinafter referred to as "HSCA"), 7 Del. C. Ch. 91, by the United States and the State on behalf of the public for injury to, destruction of or loss of Assessment Area natural resources and the services they provide.

VI. APPLICABILITY OF CONSENT DECREE

15. The provisions of this Consent Decree shall apply to and be binding on the United States, the State and DuPont, their respective directors, employees, agents, predecessors, subsidiaries, affiliates, parents, successors, and assigns. No change in ownership, corporate or partnership status relating to DuPont including, but not limited to, any transfer of assets or real or personal property, shall in any way alter the responsibilities of DuPont under this Consent Decree.

VII. DAMAGE ASSESSMENT COSTS

16. Not later than 120 days after the Effective Date of this Consent Decree, DuPont shall reimburse each Trustee for its Damage Assessment Costs in the amounts specified below.

17. DuPont shall pay \$98,898.00 for Damage Assessment Costs incurred by DOI. The DOI Past Costs shall be paid by Electronic Funds Transfer (EFT) to the U.S. Department of Justice lockbox, referencing DOJ No. 90-11-2-883/2 and the United States Attorney's Office file number, in accordance with the EFT instructions that shall be provided by the United States Attorney's office after lodging of this Decree. Any EFT received at the United States Department of Justice lockbox after 4:00 p.m. (Eastern Time) will be credited on the next business day. Defendants shall simultaneously deliver copies of the EFT transmittal notice to the Chief, Environmental Enforcement Section, U.S. Department of Justice, P.O. Box 7611, Washington D.C. 20044, Attn: DOJ No. 90-11-2-883/2. Notice of the EFT shall be sent to the Parties as specified in Section IX, as well as to:

U.S. Department of the Interior
Natural Resource Damage Assessment and Restoration Program
Attention: Restoration Fund Manager
1849 C Street, NW
Mail Stop 4449
Washington, DC 20240

18. DuPont shall pay \$173,127.30 for Damage Assessment Costs incurred by NOAA. The NOAA Past Costs shall be paid by EFT to the U.S. Department of Justice lockbox, referencing DOJ No. 90-11-2-883/2 and the United States Attorney's Office file number, in accordance with the EFT instructions that shall be provided by the United States Attorney's office after lodging of this Decree. Any EFT received at the United States Department of Justice lockbox after 4:00 p.m. (Eastern Time) will be credited on the next business day. Defendants

shall simultaneously deliver copies of the EFT transmittal notice to the Chief, Environmental Enforcement Section, U.S. Department of Justice, P.O. Box 7611, Washington D.C. 20044, Attn: DOJ No. 90-11-2-883/2. Notice of the EFT shall be sent to the Parties as specified in Section IX, as well as to:

NOAA/NOS/OR&R
ATTN: Kathy Salter, DARRF Manager
1305 East West Highway
SSMC4, Room 9331
Silver Spring, MD 20910-3281, and

Sherry Krest
United States Department of the Interior
USFWS, CBFO
177 Admiral Cochrane Dr.
Annapolis, MD 21401

19. DuPont shall pay \$24,527.21 for Damage Assessment Costs incurred by the State. DuPont shall also pay the State \$8,000.00 towards the State's claim for injury to groundwater in the Assessment Area, and the State hereby grants DuPont a credit, in the amount of \$566,000.00 for work previously performed by DuPont to extend access to a public water supply, as compensation for any remaining injury to groundwater in the Assessment Area. Both amounts required to be paid under this paragraph may, at DuPont's discretion, be paid to DNREC in the form of one check for the combined amount. Checks for payments required by this paragraph should be made payable to DNREC HSCA account, and referenced as "DuPont Newport Site" and mailed to:

Attn: Jane Biggs
DNREC - SIRB
391 Lukens Dr.
New Castle, DE 19720

Notice of payment should be sent to:

Robert Kuehl
Deputy Attorney General
DNREC - SIRB
391 Lukens Dr.
New Castle, DE 19720

20. In the event that payments required by this Section are not made within 120 days of the entry of this Consent Decree by the Court, interest, at the interest rate specified in Paragraph 14 E, on the unpaid balance shall be paid commencing on the 121st day after entry of this Consent Decree and accruing through the date of payment. Payments of interest shall be in addition to such other remedies or sanctions available to the Trustees by virtue of DuPont's failure to make timely payments under this Section. DuPont shall make all payments of interest required by this Paragraph in the manner described in this Section.

VIII. NATURAL RESOURCE RESTORATION CREDITS AND REQUIREMENTS

21. The Parties agree that the release of hazardous substances resulted in injury to natural resources in riverine, riparian, wetland ecosystems and groundwater within the Assessment Area. Under the terms of the ROD, DuPont was required to install a new water supply line along a portion of Old Airport Road and provide water hook-ups to surrounding businesses and residences. DuPont volunteered to go beyond what the ROD required and extend the water supply line and hook ups to the end of Old Airport Road, at an additional cost of \$566,000.00. As compensation for its claim for injury to groundwater, the State has granted DuPont Natural Resource Damage credit in the amount of \$566,000.00 for improving access to a public water supply. Additionally, DuPont, in consultation with EPA, DNREC, NOAA and USFWS, performed the following measures during remediation to restore injured natural

resources associated with the North and South Wetlands in the Assessment Area: Stabilization of the river berm; shoreline erosion protection; sediment excavation to a depth of more than twice of what was required by the ROD; construction of a water control structure; sediment stabilization with erosion matting; and Phragmites control. These measures had the effect of improving drainageway habitat, increasing the amount of open water at high tide, improving water quality, and providing better forage and cover for fish and wildlife in the North and South Wetlands. The Trustees have determined that the restoration measures taken by DuPont improved the North and South Wetlands beyond their baseline condition. The Trustees have quantified these restoration measures in the DARP, and have credited DuPont accordingly for restoring injured natural resources in the Assessment Area.

22. In order to fully compensate the public for the lost use of Assessment Area natural resources between the time of the release and the time the Assessment Area resources were restored, DuPont has agreed to purchase an Environmental Covenant on the Pike Property and to fund certain restoration measures to be performed by the Trustees on the Pike Property as set forth in the DARP. The 56 acre Pike Property, located on the Kent and Sussex county line approximately 55 miles down Delaware Bay from the Christina River, includes upland and emergent tidal wetlands. Restoration of the Pike Property is expected to result in significant habitat improvements in the Mispillion River ecosystem. Natural resources such as blue crab, Atlantic herring, spot, and striped bass, use the entire Delaware estuary and its rivers (e.g., the Christina and Mispillion Rivers) as spawning and nursery areas. Therefore, the Trustees determined that the Delaware Estuary represented the relevant watershed for siting additional restoration actions that will fully compensate the public for the lost use of Natural Resources in

the Assessment Area. The habitat on the Pike Property closely resembles that of the Assessment Area. Therefore, selection of the Pike Property for restoration opportunities outside the Christina sub-watershed of the Delaware Estuary was determined by the Trustees to be appropriate.

23. Restoration Costs. Not later than 30 days after the Effective date of this Consent Decree, DuPont agrees to pay \$742,653.00 to the Trustees to be used by the Trustees to implement Restoration Projects in the Environmental Covenant area (Pike Property), as set forth in the DARP (Attachment A). This payment is expected to cover costs associated with the Restoration Projects, including costs for FWS to develop design documentation and performance measures to implement the DARP, as well as other costs including, but not limited to, Trustee oversight and monitoring, administration, and costs outside the DARP as described in paragraph 24 below. These funds shall be placed in an account in the Department of Interior's Natural Resource Damage Assessment and Restoration (NRDAR) Fund, and used in accordance with the "Agreement Among Trustees" (Attachment C). The NRDAR account will be known as the "DuPont Newport Account". Payment shall be made as follows:

U.S. Department of Interior
Natural Resource Damage Assessment and Restoration Program
Attention: Restoration Funds Manager
1849 C Street, NW
Mail Stop 4449
Washington D.C. 20240

24. Costs Outside the DARP. In the event that unanticipated conditions require actions outside the DARP to assure the success of the Restoration Projects, the FWS, as Lead Administrative Trustee, shall notify DuPont and provide documentation as to the need for the

proposed expenditure(s). DuPont shall be provided with an opportunity to comment or object within two weeks of receipt of such notice. If DuPont does not respond, FWS may assume DuPont has no objection and may use the funds for the activities described in the notice. If, however, FWS receives comments from Dupont, FWS will attempt to accommodate those comments when appropriate. Notwithstanding the notice requirement described herein, the Trustees will make the final decision as to whether to proceed with activities described in the notice.

25. Certification of Completion and Accounting. During the period of restoration construction as described in the DARP, DOI shall provide DuPont with a written accounting of monies spent from the NRDAR Fund DuPont Newport Account at least every sixty days. Within 90 days after the Trustees certify that restoration is complete, the Trustees shall provide notice to DuPont of such completion and a final written accounting of monies spent from the DuPont Newport Account. Any unspent monies from this account, including interest accumulated, shall be reimbursed to DuPont within 180 days of the notification of the certification that the restoration is complete.

26. Monitoring Plan. DuPont shall implement the Monitoring Plan (Attachment D) including all corrective actions, per Trustee oversight. The Parties may agree to modifications in the Monitoring Plan. All agreed upon modifications must be made in writing.

27. Environmental Covenant. In order to ensure that the restored natural resources and the services they provide are preserved in perpetuity, DuPont has entered into an agreement with William and Sharon Pike of 661 Shawnee Road, Milford Delaware 19963 to execute an Environmental Covenant. The Environmental Covenant for the Pike Property has been executed

and recorded in the deeds records of Sussex and Kent Counties, Delaware, and is Attachment E to this consent Decree. Within 60 days of the days after receipt of notice of certification that restoration is complete, DuPont shall pay the sum of \$50,000 to the Delaware Department of Fish and Wildlife for monitoring and maintenance of the Environmental Covenant on the Pike Property. Payment shall be made as described in paragraph 19, except that the check shall be referenced "DuPont Environmental Covenant."

IX. NOTICE

28. Whenever notice is required to be given by one Party to another, it shall be directed to the following individuals at the addresses specified below, unless otherwise specifically provided for in this Consent Decree. Any change in the individuals designated by any Party must be made in writing to the other Parties. All notices shall be sent by first-class mail.

For DOJ: Chief, Environmental and Enforcement Section
Environment and Natural Resource Division
U.S. Department of Justice
P.O. Box 7611
Ben Franklin Station
Washington, DC 20044-7611
DJ # 90-5-1-1-07673

For NOAA: Sharon Shutler, Esq.
NOAA Office of General Counsel
1315 East-West Highway, Room 15132
Silver Spring, MD 20910

For DOI: Mark Barash, Esq.
Office of the Solicitor
U.S. Department of the Interior
Suite 612
1 Gateway Center
Newton Corner, MA 02458

For DNREC: Jane Biggs
DNREC - SIRB

391 Lukens Dr.
New Castle, DE 19720

For Du Pont: Ralph G. Stahl, Jr., Ph.D., D.A.B.T.
Principal Consultant
DuPont Corporate Remediation Group
Barley Mill Plaza, Bldg. 19
Route 141 & Lancaster Pike
Wilmington, Delaware 19805

X. DISPUTE RESOLUTION

29. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedure of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. However, the procedures set forth in this Section shall not apply to actions by the United States or the State to enforce obligations of DuPont that have not been disputed in accordance with this Section.

30. Informal Dispute Resolution. If, in the opinion of either the Trustees or DuPont, there is a dispute which arises under or with respect to this Consent Decree, that Party shall send written notice to the other Party or Parties outlining the nature of the dispute and requesting negotiations to resolve the dispute. The Parties shall endeavor to resolve the dispute through good faith negotiations. The period for informal negotiations shall not exceed 30 days from the date the notice is sent, unless this time period is modified by written agreement of the Parties. At any time during informal negotiations, the Parties may agree to take their dispute before a mutually agreed upon mediator. The outcome of the mediation, however, shall be non-binding.

31. Formal Dispute Resolution.

A. In the event that the Parties cannot resolve a dispute by informal negotiations under the preceding Paragraph, then the position advanced by the Trustees shall be considered binding unless, within 30 days after the conclusion of the informal negotiation period, DuPont invokes the formal dispute resolution procedures of this Section. DuPont shall invoke formal dispute resolution by serving the Trustees with a written Statement of Position on the matter in dispute including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by DuPont.

B. Within 60 days after receipt of DuPont's Statement of Position, the Trustees will serve on DuPont their Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by the Trustees. Within 15 days after receipt of this Statement of Position, DuPont may submit a Reply.

C. An administrative record of the dispute shall be maintained by the Trustees and shall contain all statements of position, including supporting documentation, submitted pursuant to this Section. Where appropriate, the Trustees may allow submission of supplemental statements of position by the Parties to the dispute.

D. The Trustees will issue a final decision resolving the dispute based on the administrative record described in Paragraph 31 C, above. This decision shall be binding on DuPont, subject only to the right to seek judicial review pursuant to Paragraph 31 E.

E. Any decision made by the Trustees pursuant to Paragraph 31 D, above, shall be reviewable by this Court, provided that a motion for judicial review of the decision is filed by

with the Court and served on all Parties within 10 days of receipt of the Trustees' decision. The motion shall include a description of the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The Trustees may file a response to DuPont's motion.

F. In any judicial proceedings on any dispute governed by this Consent Decree, DuPont shall have the burden of demonstrating that the decision of the Trustees is not in accordance with the requirements of the Consent Decree, according to a standard of review based on applicable law. Judicial review of the decision of the Trustees shall be on the administrative record.

32. The invocation of informal or formal dispute resolution procedures pursuant to this Section shall not extend, postpone or affect in any way any obligation of DuPont under this Consent Decree that is not directly in dispute, unless the Trustees agree or the Court rules otherwise.

XI. COVENANTS NOT TO SUE BY THE UNITED STATES AND THE STATE

33. In consideration of the satisfactory performance by DuPont of all of the obligations under this Consent Decree, and except as specifically provided in Section XII, the United States and the State each hereby covenant not to sue or to take administrative action against DuPont for Natural Resource Damages at the Assessment Area. This covenant is effective upon fulfillment by DuPont of all the obligations contained in this Consent Decree.

XII. RESERVATION OF RIGHTS BY THE UNITED STATES AND THE STATE

34. Notwithstanding any other provision of this Consent Decree, the United States and the State reserve the right to institute civil or administrative proceedings, as applicable, against DuPont in this action or in a new action, seeking recovery of additional Natural Resource Damages, if:

- (i) new conditions, including the release of hazardous substances at or from the Plant Site that were previously unknown to the Trustees, are discovered; or
- (ii) new information about the release of hazardous substances from the Plant Site that previously was unknown to the Trustees, in whole or in part, is received, and these previously unknown conditions or this information, together with any other relevant information, indicates that there are new or additional injuries to, destruction of, or losses of natural resources or new or additional natural resource service losses that were unknown to the Trustees when they issued the DARP.

35. Information and conditions known to the Trustees shall include only the information and conditions set forth in Attachment F.

36. Nothing in the Consent Decree is intended to be, nor shall be construed as, a release from liability or a covenant not to sue for any claim or cause of action, administrative or judicial for the following:

- A. DuPont's failure to meet its obligations contained in this Consent Decree;
- B. Claims brought on behalf of the U.S. or Delaware, other than for Natural Resource Damages that are the subject of this Consent Decree;

C. Liability arising from any past, present, or future releases of hazardous substances resulting in injuries to natural resources outside the Assessment Area;

D. Liability arising from any releases of hazardous substances from any site or location that is not the subject of this Consent Decree, including, but not limited to, any hazardous substance taken from the Assessment Area and disposed of at another site or location;

E. Liability for violations of Federal or State law which occur during or are incident to the implementation and/or monitoring of the Restoration Projects;

F. Any and all criminal liability; and

G. Any matter not expressly included in the covenant not to sue for Natural Resource Damages set forth in Section XI.

XIII. COVENANTS BY DUPONT

37. DuPont hereby covenants not to sue and agrees not to assert any claims or causes of action against the U.S. and State of Delaware for any claims arising from or relating to the Restoration Projects or any claims arising from or relating to Natural Resource Damages, pursuant to any Federal, State, or common law, including, but not limited to the following:

A. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U.S.C. § 9507) through Sections 107, 111, 112, and 113 of CERCLA, 42 U.S.C. §§ 9607, 9611, 9612, and 9613, or any other provision of State or Federal law; or

B. any claims arising out of activities related to the Restoration Projects, including without limitation, claims based on the Trustees' selection of the Restoration Projects, oversight of the Restoration Projects, and/or approval of plans for such activities.

38. DuPont hereby covenants not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States or the State provide written notice that one or both of them no longer supports entry of the Consent Decree.

39. Notwithstanding any other provision of this Consent Decree, this Consent Decree is without prejudice to all rights of DuPont with respect to all matters other than those expressly specified in the covenants set forth in this Section.

XIV. EFFECT OF SETTLEMENT/CONTRIBUTION PROTECTION

40. Nothing in this Consent Decree shall be construed to create any right in, or grant any cause of action to, any person not a Party to this Consent Decree. Each of the Parties expressly reserves any and all rights (including, but not limited to, any right of contribution), defenses, claims, demands, and causes of action which each party may have with respect to this release of hazardous substances against any person not a Party hereto.

41. In any subsequent administrative or judicial proceeding initiated by the United States or Delaware pursuant to Section XII, DuPont shall not assert, and may not maintain any defense or claim based on the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, statute of limitations, or any other defenses based upon the contention that the claims raised by the Trustees in the subsequent proceeding were or should have been brought in the instant case, provided, however, that nothing in this Paragraph affects the enforceability of the covenant not to sue set forth in Section XI. In the event the United States or Delaware initiates a subsequent administrative or judicial proceeding pursuant to Section XII, DuPont expressly reserves all other potential defenses to such administrative or judicial proceeding.

42. The Parties agree, and by entering into this Consent Decree this Court finds, that as of the date of this Consent Decree DuPont is entitled, to protection from contribution actions or claims as provided by Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2), and HSCA, 7 Del. C. §9107(c) for Natural Resource Damages at this Site.

XV. CERTIFICATION

43. Each undersigned representative of a Party to this Consent Decree certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this document.

XVI. VOIDABILITY

44. If for any reason the District Court should decline to approve entry of this Consent Decree in the form presented, or if the United States or the State withdraws its consent pursuant to Section XX, this Consent Decree and the settlement embodied herein shall be voidable by written notice to the other Parties at the sole discretion of any Party to this Consent Decree, and the terms hereof may not be used as evidence in any litigation.

XVII. MODIFICATION

45. Any material modification to the DARP (Attachment A) may be made by written agreement between the Trustees and DuPont, or in accordance with the dispute resolution process, as provided in Section X.

46. Any modification that materially alters a requirement of this Consent Decree, other than requirements of the DARP, must be approved by the Court.

XVIII. COMPLIANCE WITH OTHER LAWS

47. This Consent Decree shall not be construed in any way to relieve DuPont or any other person or entity from the obligation to comply with any Federal, State, or local law.

XX. RETENTION OF JURISDICTION

48. This Court retains jurisdiction over both the subject matter of this Consent Decree and the Parties for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or material modification of this Consent Decree, or to effectuate or enforce compliance with its terms.

XXI. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

49. The Parties agree and acknowledge that final approval by the United States and the State and entry of this Consent Decree (including Attachments) is subject to a thirty-day (30) period for public notice and comment in accordance with U.S. Department of Justice policy. The United States and the State reserve the right to withdraw or withhold their consent if comments regarding the Consent Decree disclose facts or considerations that indicate that the Consent Decree is inappropriate, improper, or inadequate. DuPont consents to the entry of this Consent Decree without further notice.

XXII. TERMINATION

50. Any Party may apply to the Court to terminate this Consent Decree after:

(A) All costs have been paid as provided in Sections VII and VIII;

(B) All restoration and monitoring actions are completed as provided for in Section VIII; and

(C) All requirements related to the Environmental Covenant as set forth in Section VIII have been completed.

XXIII. EFFECTIVE DATE

51. This Consent Decree shall be effective upon the Date of Entry by the Court.

XXIV. SIGNATORIES/SERVICE

52. DuPont shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on their behalf with respect to all matters arising under or relating to this Consent Decree. DuPont hereby agrees to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable rules of this Court, including, but not limited to, service of a summons.

53. This Consent Decree may be executed in any number of counterparts and, as executed, shall constitute one agreement binding on all of the Parties hereto, even though all of the Parties do not sign the original or the same counterpart.

XXIII. FINAL JUDGMENT

54. This Consent Decree and its Attachments constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in the Consent Decree. The parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Consent Decree. The Attachments to this consent decree are as follows:

Attachment A - DARP

Attachment B - Map of Assessment Area

Attachment C - Agreement Among Trustees

Attachment D - Monitoring Plan

Attachment E - Environmental Covenant

Attachment F - Information and Conditions known to the Trustees

Attachment G - Summary of Costs

55. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between and among the United States, the State, and DuPont.

SO ORDERED THIS _____ DAY OF _____, 2006.

UNITED STATES DISTRICT JUDGE

FOR THE PLAINTIFF UNITED STATES:

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Assistant Attorney General
Environment and Natural Resources
Division
U.S. Department of Justice
Washington, D.C. 20530

DATE: 8/11/06


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Deputy Chief
Environmental Enforcement Section
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Division
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Of Counsel

Sharon Shutler, NOAA
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FOR PLAINTIFF UNITED STATES, continued

COLM F. CONNOLLY
United States Attorney
District of Delaware

DATE: 9/28/06

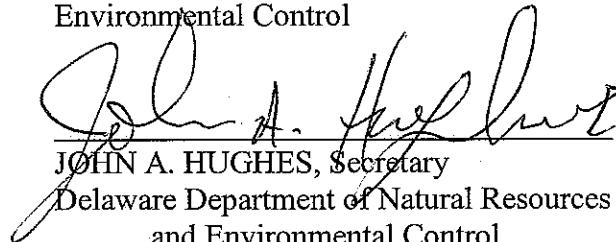
Douglas E. McCann

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FOR PLAINTIFF STATE OF DELAWARE:

Delaware Department of Natural Resources and
Environmental Control

DATE: 8-28-06


JOHN A. HUGHES, Secretary
Delaware Department of Natural Resources
and Environmental Control

89 Kings Highway
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As to form:

Delaware Department of Justice

DATE: 9/19/06


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FOR THE DEFENDANT E.I. DU PONT de NEMOURS
and COMPANY:

DATE: 5/23/2006

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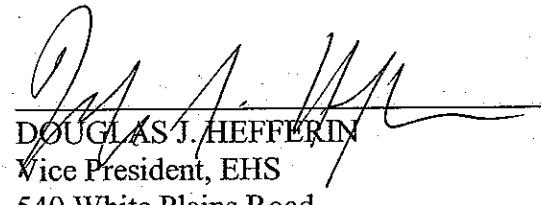
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A. Dwight Bedsole

A. DWIGHT BEDSOLE, Director
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FOR DEFENDANT CIBA SPECIALTY CHEMICALS
CORPORATION:

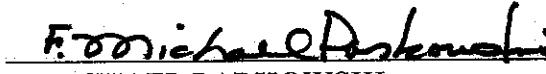
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DOUGLAS J. HEFFERIN
Vice President, EHS
540 White Plains Road
Tarrytown, New York 10591

(kp)

On behalf of Ciba Specialty Chemicals Corporation and
Ciba-Geigy Corporation, the previous owner of the Ciba
portion of the Site.

DATE: August 1, 2006


F. MICHAEL PARKOWSKI
Parkowski, Guerke & Swayze, P.A.
116 W. Water Street
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Dover, DE 19903-0598

ATTACHMENT A
DAMAGE ASSESSMENT AND RESTORATION PLAN

United States of America and the State of Delaware

v.

**E. I. du Pont de Nemours and Company &
Ciba Specialty Chemicals Corporation**

Consent Decree

2006

DRAFT FINAL

**Damage Assessment and Restoration Plan/Environmental
Assessment
for the
DuPont Newport Superfund Site, Newport, Delaware**

May 2006

Prepared by:

**National Oceanic and Atmospheric Administration
Delaware Department of Natural Resources and Environmental Control
and
The United States Fish and Wildlife Service
on behalf of the
U.S. Department of the Interior**

Send Comments to:

Jane Biggs Sanger
Delaware Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation and Restoration Branch
391 Lukens Drive
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1.0 INTRODUCTION

This Draft Damage Assessment and Restoration Plan/Environmental Assessment (Draft DARP/EA) has been developed by the Delaware Department of Natural Resources and Environmental Control (DNREC), the National Oceanic and Atmospheric Administration (NOAA) of the U. S. Department of Commerce, and the United States Fish and Wildlife Service (USFWS) on behalf of the U.S. Department of the Interior (DOI), (collectively, "the Trustees") to address natural resources, including ecological services, injured, lost, or destroyed due to releases of contamination from the DuPont Newport Superfund Site ("Newport Site" or "Site") in New Castle County, Delaware.

The Draft DARP/EA identifies the restoration action(s) taken by DuPont as part of the site remediation, and actions that the Trustees would prefer to implement as part of a natural resource settlement that the Trustees jointly recovered for natural resource damages attributed to the Newport Site. The natural resource settlement is the result of a cooperative natural resource damage assessment between E.I. du Pont de Nemours and Company (DuPont) and the Trustees. During this cooperative process, the Trustees and DuPont reached a mutually acceptable natural resource damages settlement. In this proposed damage assessment and restoration plan, the Trustees' natural resource damages claim is to be compensated, in part, by the DuPont restoration activities that were completed at the time of the remedial action. In addition, DuPont will provide funding to implement the preferred alternative and purchase a conservation easement on property in Delaware. The restoration and funding thereof will be overseen by the Trustees pursuant to a Consent Decree (hereafter, "Consent Decree"). Under applicable laws and the terms of the Consent Decree, the damages to be recovered by the Trustees may only be used to plan, implement and oversee a plan providing for the preservation and enhancement of tidal wetlands as a means of restoring natural resources and services comparable to those injured or lost. In this case, the natural resource damages will be compensated in terms of the restoration and enhancement of the tidal wetlands at the Newport Site, and in Milford, Delaware, the preservation and enhancement of tidal wetland habitat and its services under Trustee supervision.

1.1 AUTHORITY

This Draft DARP/EA was prepared jointly by the Trustees pursuant to their respective authority and responsibilities as natural resource trustees under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 *et seq.*; the Federal Water Pollution Control Act, 33 U.S.C. § 1251, *et seq.*) (also known as the

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Clean Water Act or CWA), and other applicable federal or state laws, including Subpart G of the National Oil and Hazardous Substances Contingency Plan (NCP), at 40 C.F.R. §§ 300.600 through 300.615, and DOI's CERCLA natural resource damage assessment regulations at 43 C.F.R. Part 11 (NRDA regulations) which provide guidance for this restoration planning process under CERCLA.

1.2 NEPA COMPLIANCE

Actions undertaken by the Trustees to restore natural resources or services under CERCLA and other federal laws are subject to the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 *et seq.*, and the regulations guiding its implementation at 40 C.F.R. Parts 1500 through 1517. In general, federal agencies contemplating implementation of a major federal action must produce an environmental impact statement (EIS) if the action is expected to have significant impacts on the quality of the human environment. When it is uncertain whether a contemplated action is likely to have significant impacts, federal agencies prepare an environmental assessment (EA) to evaluate the need for an EIS. If the EA demonstrates that the proposed action will not significantly impact the quality of the human environment, the agency issues a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required. For a proposed restoration plan, if a FONSI determination is made, the Trustees may then issue a final restoration plan describing the selected restoration action(s).

In accordance with NEPA and its implementing regulations, this Draft DARP/EA

- Summarizes the current environmental setting and that resulting from the restoration activities,
- Describes the purpose and need for additional restoration actions,
- Identifies alternative actions, assesses their applicability and potential impact on the quality of the physical, biological and cultural environment, and
- Summarizes the opportunity the Trustees provided for public participation in the decision-making process.

Based on the draft EA integrated into this Draft DARP/EA, the federal Trustees – NOAA and USFWS – have determined that the proposed restoration actions do not meet the threshold requiring an EIS, and barring public comments on this Draft DARP/EA, a Finding of No Significant Impact will be issued.

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1.3 PUBLIC PARTICIPATION

The Trustees have prepared this Draft DARP/EA to:

- Provide the public with information on the natural resources injuries and services losses assessed in connection with the Site,
- Present the restoration already completed on the part of DuPont,
- Provide the restoration objectives which have guided the Trustees in developing this plan,
- Present the restoration alternatives which have been considered, and
- Discuss the process used by the Trustees to identify preferred restoration alternatives and the rationale for their selection.

Public review of the restoration plan proposed in this Draft DARP/EA is an integral and important part of the restoration planning process and is consistent with all applicable state and federal laws and regulations, including NEPA and its implementing regulations, and the guidance for restoration planning found within 40 C.F.R. Part 11.

The restoration plan proposed in this Draft DARP/EA is being made available for review and comment by the public for a period of 30 days. The deadline for submitting written comments on the Draft DARP/EA is specified in one or more public notices issued by the Trustees to announce its availability for public review and comment. Comments are to be submitted in writing to:

Jane Biggs Sanger
 Delaware Department of Natural Resources and Environmental Control
 Division of Air and Waste Management
 Site Investigation and Restoration Branch
 391 Lukens Drive
 New Castle, Delaware 19720
 Voice: 302 395-2600
 Fax: 302-395-2601

The Trustees will consider all written comments received prior to approving and adopting a Final Damage Assessment and Restoration Plan/Environmental Assessment (Final DARP/EA). Written comments received and the Trustees' responses to those comments, whether in the form of plan revisions or written explanations, will be summarized in the Final DARP/EA.

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1.4 ADMINISTRATIVE RECORD

The Trustees have maintained records documenting the information considered and actions taken by the Trustees during this restoration planning process, and these records collectively comprise the Trustees' administrative record (AR) supporting this Draft DARP/EA.

Information and documents, including any public comments submitted on this Draft DARP/EA as well as the Final DARP/EA, are included in this AR as received or completed. These records are available for review by interested members of the public. Interested persons can access or view these records at the offices of:

Delaware Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation and Restoration Branch
391 Lukens Drive
New Castle, Delaware 19720
Phone: 302-395-2600
Fax: 302-395-2601

Arrangements must be made in advance to review or to obtain copies of these records by contacting the person listed above. Access to and copying of these records are subject to all applicable laws and policies including, but not limited to, laws and policies relating to copying fees and the reproduction or use of any material that is copyrighted.

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2.0 PURPOSE AND NEED FOR RESTORATION

This section generally describes the Site, summarizes the response actions which were undertaken, summarizes the Trustees' assessment of resource injuries and compensation requirements related to the Site, and provides more detailed information on the physical, biological, and cultural environments in the area affected by releases of contaminants from the Site.

2.1 OVERVIEW OF THE SITE

The Newport Site is located along the Christina River in Newport, Delaware near the I-95, I-495, and Delaware State 141 interchange. The approximately 120-acre Site consists of a pigment manufacturing plant now owned by CIBA Specialty Chemicals Corporation (CIBA), a former chromium dioxide production facility (DuPont Holly Run Plant), two inactive landfills separated by the Christina River, a small recreational area (Ballpark), and associated wetland areas and segment of the Christina River. (Figure 2-1)

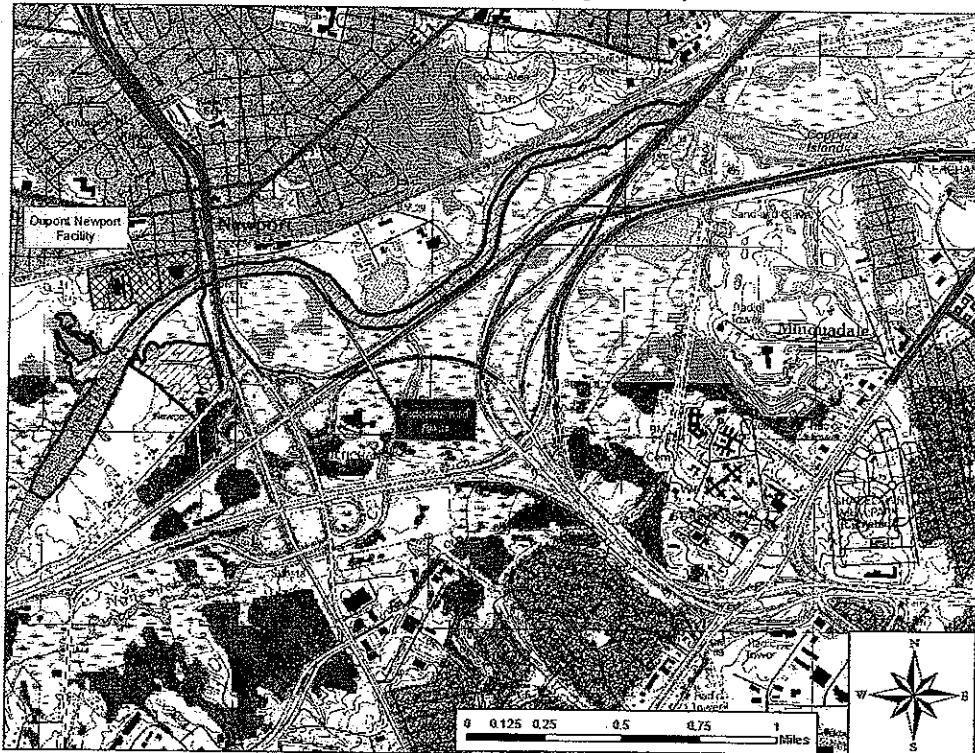


Figure 2-1 - The DuPont Newport Superfund Site, New Castle County, Delaware

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Pigment manufacturing began at the Site in 1902 when the site was owned and operated by Henrik J. Krebs. Krebs manufactured Lithopone, a white inorganic pigment, until 1929 when DuPont purchased the plant. Lithopone was produced until approximately 1952. The site then transitioned to manufacturing titanium dioxide as a paint pigment. DuPont also manufactured copper phthalocyanine (CPC) and quinacridone (QA), both organic pigments. Historical operations also included the production of chromium dioxide, high-purity silicon, and other organic and inorganic pigments. The pigment manufacturing operations were purchased by CIBA-GEIGY in 1984 and continue to operate today. DuPont retained the chromium dioxide magnetic recording tape operation at the Holly Run Plant. However, the Holly Run Plant ceased operation in 2000.

During plant operations, two portions of the site bordering the Christina River were used as waste disposal landfills. Landfilling occurred in the North Disposal site and the South Disposal site. The North Disposal site (approximately 7.6 acres) was used for disposal of general refuse and process waste from early 1902 until 1974. After disposal ceased in 1974, the North Disposal site was capped with approximately 2 feet of clayey material. The South Disposal site (approximately 17 acres) was operated from approximately 1902 to 1953. Material deposited in this landfill primarily consisted of insoluble residues of zinc and barite ores that were pumped as slurry through a pipeline across the Christina River.

Two organic pigments (CPC and QA) were manufactured at the site between 1948 and 1958. The presence of tetrachloroethene (PCE) and trichloroethene (TCE) in the soil and groundwater is believed to be associated with the historical use of these organic solvents in the production of these pigments.

In 1987, the United States Environmental Protection Agency ("EPA") proposed the inclusion of the Site to the National Priorities List ("NPL") based on the release or threatened release of contaminants, making it a priority Site for investigation and potential clean-up under CERCLA. The site was listed in 1990. In 1988, DuPont entered into an Administrative Order by Consent with EPA whereby DuPont agreed to perform a Remedial Investigation and Feasibility Study (RI/FS) for the site. The RI/FS was conducted between August 1988 and August 1992. The EPA Record of Decision was released in August 1993. A Remedial Design/Remedial Action Work Plan was completed in 1994 (DuPont Environmental Remediation Services, 1994). The Site was broken down into 7 operable units. Remedial actions began in 1996 and were completed in 2002.

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Human Use Characteristics

Current land uses at the Site include: CIBA manufacturing operations, a pump and treat system on the former Holly Run Plant, landfills, wetlands, and wooded upland areas. Manufacturing operations are located to the north of the Christina River. Access to the northern part of the Site is restricted by CIBA security. Access to the areas south of the Christina River is restricted by institutional controls (i.e., fencing and vegetative barrier). The existing land uses at CIBA, Newport-associate landfills and wetlands are expected to continue indefinitely.

Surface Water Characteristics

The surface water hydrology in the area of the Newport Site is highly influenced by the tidal water flow of the Christina River with a tidal range of approximately 4 to 5 feet. Surface water characteristics are different for both the North and South Wetlands, and have changed as a result of the remedial and restoration activities. Remedial/restoration activities completed at the site have enhanced both the retention and tidal water exchange within these wetland areas.

Prior to remedial activities, the North Wetlands consisted mostly of high marsh habitat (Figure 2-2). The marsh was inundated by high tides, except when the river base flow was low. At low tide, the North Wetlands would drain completely. Typically, the marsh would be regularly inundated only for several days during the spring high tides. The restoration of the North Wetlands provided a permanent pool of water by removal of additional sediment material and the construction of a water control structure at the river berm. This design allowed the wetland to be inundated daily with high tide. Re-enforcement/stabilization of the river berm ensured the longer-term protection of the wetlands. (Figure 2-3)

The South Wetlands mostly consisted of high marsh habitat. During the Remedial Investigation, potential sources of water for the wetlands were considered to be precipitation, groundwater discharge, and surface runoff. During the Remedial Design phase, it was discovered that the South Wetlands were tidally influenced. River water would enter into the wetlands from culverts located under Old Airport Road. Water would then slowly exit at these culverts or through the tidal gate directly into the Christina River. (The tide gate restricts inflow but allows outflow.) The monotypic stand of *Phragmites* concealed the tidal water flow through the wetlands. In addition, the dense root mass and stand of *Phragmites* throughout the wetland area restricted water movement through the wetland area (Figure 2-4). Similar to the North Wetlands, the marsh was inundated by high tides, except when the river base flow was low.

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Figure 2-2. North Wetlands – Pre-remediation

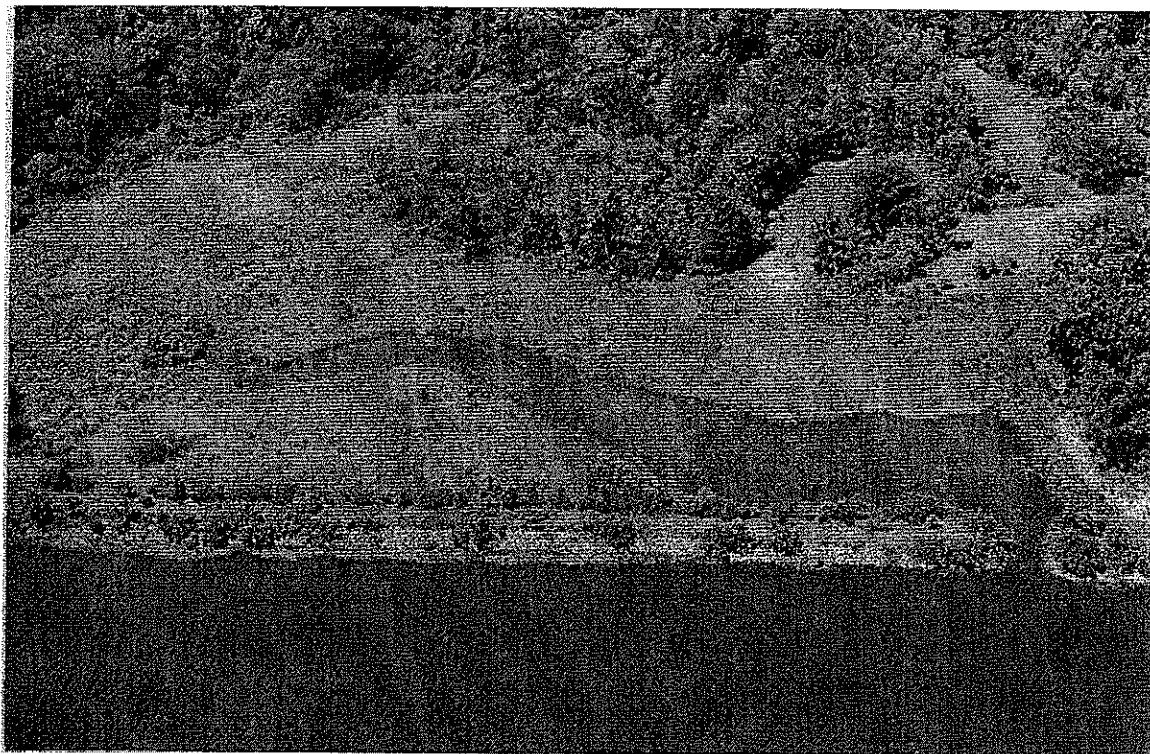
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Figure 2-3 - North Wetlands – Post Restoration

A raised upland berm extended across the marsh from east to west and bisected the emergent marsh into a northern non-tidal portion and a southern tidal portion. Permanent standing water within the South Wetlands was limited to the South Pond. The South Pond, located north of the berm, was approximately two feet deep and one acre in size. The pond was isolated from adjacent drainages and was engulfed by a dense stand of *Phragmites*. In the warmer months, the surface water in the pond was choked with spatterdock and duckweed. Precipitation, groundwater discharge, and surface runoff were the primary sources of water for the pond. Because it is isolated from the adjacent drainages, the pond had limited recruitment of, and establishment of indigenous fish populations (Woodward-Clyde, 1992).

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Figure 2-4 - South Wetland – Pre-remediation (looking from the S).

During the remediation of the South Wetlands, portions of the berm up to 11 feet in depth were removed to create hummocks. Berm removal resulted in the opportunity to open the South Pond to tidal influence. The South Pond did not require remediation, however two feet were excavated to remove fine-grained sediments. It also was recontoured to provide a more gradual intertidal zone that was vegetated with emergent vegetation forms. Drainage features were added to facilitate sufficient water storage between high-tide cycles and develop more direct access to improve the tidal exchange throughout the South Wetlands. Tidal habitat was significantly improved by the removal of additional materials from the wetlands, berm, and South Pond areas, in conjunction with the enhancement of drainage features (Figure 2-5).

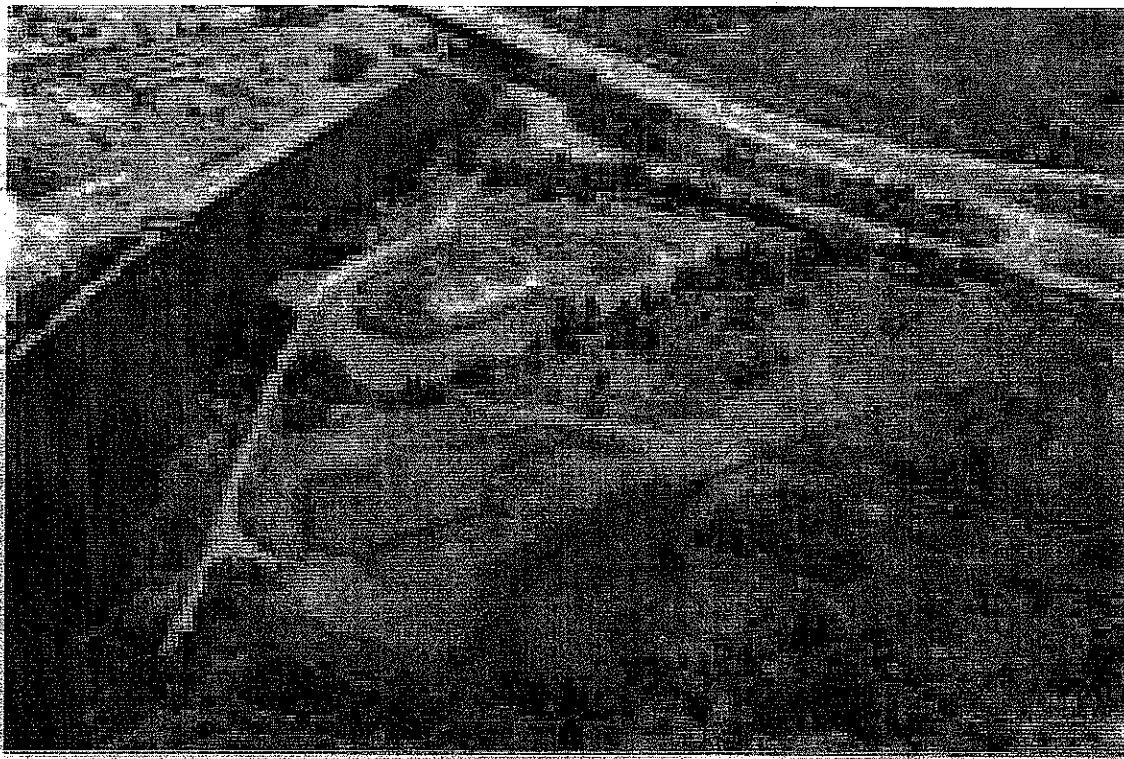
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Figure 2-5 - South Wetlands – Post Restoration (looking from the SE).

Habitat Characteristics

Pigment manufacturing continues at the CIBA Plant on the north side of the Christina River. The former Holly Run Plant has been reduced to an office trailer and a warehouse that contains the groundwater pump and treatment operation for the Site. As part of the ROD, the manufacturing areas have been paved to minimize infiltration. The North and South Landfill areas also have been covered as part of the ROD requirements and have been planted with warm season grasses. The Ballpark is located off-site. A small quantity of soil was removed as part of the remedial action. The Ballpark is currently owned by the City of Newport and is being used for recreational activities. The remaining property consists of the North and South Wetlands that are bisected by the Christina River.

Prior to remedial activities, the North and South Wetland areas were classified as high marsh. Surface water exchange and influence by the tidal waters of the Christina River were limited. The vegetation within these wetlands was typical for the Christina River watershed.

Phragmites dominated a large portion of the North Wetlands and almost the entire South Wetlands. The remainder consisted largely of a simple herbaceous layer with limited

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vegetation strata and cover types. Because of this limited strata, cover types, and open water, the potential functional capacity for wildlife was limited. Dense stands of *Phragmites* also provided limited benefit to wildlife and eliminated vegetation of higher wildlife value (DuPont Environmental Remediation Services 1997a, and 1997b).

Remedial and restoration activities greatly enhanced the overall habitat; providing a higher functioning wetland habitat that continues to improve over time. DuPont proactively evaluated and incorporated additional restoration options beyond those required in the ROD. As part of this process, DuPont met with representatives of the United States Environmental Protection Agency, Delaware Department of Natural Resources and Environmental Control (DNREC), National Oceanic and Atmospheric Administration (NOAA), and the United States Fish and Wildlife Service (USFWS) to define additional potential restoration options that would be considered valuable to the stakeholders. The identified restoration options were then evaluated using the Evaluation of Planned Wetlands (EPW) to develop a restoration plan that best balanced the different potential wetland functions. Descriptions of the current North and South Wetlands are provided below.

North Wetlands

The North Wetlands now consist of equal proportions of high and low marsh habitat that includes four cover types. Palustrine Emergent Marsh (PEM) is the dominant cover type and includes mudflats that are exposed at low tide, and aquatic beds that support rooted and submerged aquatic vegetation. The marsh is regularly inundated by high tides and contains a permanent pool. The *Phragmites* control program has been successful in minimizing its presence. Vegetation within the North Wetlands has become increasingly more diverse structurally with added strata, cover types, and greater vegetation/water interspersion. The plant community species richness for the entire North Wetlands is composed of 88 taxa (10 planted species and 78 naturally recruited species). This species richness greatly surpasses that observed in the reference area (Banning Marsh) in which only 39 species were noted (DuPont Corporate Remediation Group (CRG), 2002a).

Successful restoration of the North Wetland has vastly improved the functional capacity of this wetland to support fish communities in the Christina River. Fisheries surveys conducted in 1999, 2001, and 2002 have proven that the North Wetland supports a healthy diverse fish community comprised of freshwater and estuarine species. The installation of a water control structure has successfully created a tidal open water habitat that maintains a continuous pool of water within the North Wetland and also allows for tidal flushing back into dense and diverse marsh vegetation. The increased (and increasing) complexity of this

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habitat type within the marsh provides niches for fish from all life stages (mature, mature spawning, juvenile, young-of-the-year, and larval fish). Currently, fisheries survey results suggests that one of the North Wetland's primary functions is a fish community nursery area. The collection of fishes from all life stages indicates that the aquatic habitat also functions as spawning and feeding grounds for numerous species. Overall, the abundance and structure of this fish community clearly demonstrate that the North Wetlands have been successfully restored to a level where the aquatic habitat now functions as an integral part of fisheries development and recruitment within the Christina River Watershed. (DuPont CRG, 2002a).

The well-established fish and benthic communities provide a substantial food source for birds that now frequent the area. Historically, the low quality habitat provided little niche space that resulted in low overall species richness. Use of the wetlands has increased over time and the bird community has become an integral part of the complex wetland food web. Both migratory and resident bird species that fill various trophic levels have been observed including piscivores (e.g., great egrets, osprey), invertivores (e.g., American robin, swallows), and granivores (e.g., red-winged blackbirds, sparrows). Many of these birds rely on the wetlands for foraging, nesting, breeding, and shelter.

South Wetlands

Similar to the North Wetlands, the South Wetlands now consists of equal proportions of high and low marsh habitat. The marsh and pond are twice daily inundated by high tides and contain several permanent pools. Palustrine Emergent Marsh (PEM) is the dominant cover type and includes mudflats that are exposed at low tide, and aquatic beds that support rooted and submerged aquatic vegetation. Vegetation within the South Wetlands has become more diverse structurally with added strata, cover types, and greater vegetation/water interspersion. The plant community species richness for the South Wetlands is composed of 71 taxa (5 planted species and 66 naturally recruited species). This species richness greatly surpasses that observed in the reference area (Nonesuch Creek) in which only 26 species were noted (DuPont CRG, 2003b). Successful establishment of diverse wetlands vegetation cover has provided the basis for increasing functional capacity for providing sediment stabilization, water quality and wildlife functions (DuPont CRG 2002c). The *Phragmites* control program has been successful in minimizing its presence.

Successful restoration of the South Wetland has vastly improved the functional capacity of this wetland to support fish communities in the Christina River. The drainage features continue to promote tidal flushing of the South Wetlands and water exchange within the South Pond. Fisheries surveys conducted annually in 2000, 2002, and 2003 have indicated that the South Wetland supports a healthy diverse fish community comprised primarily of

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freshwater species with occasional use by estuarine species. The removal of dense stands of *Phragmites*, coupled with the restoration of drainage systems in the wetland have successfully created a tidally contiguous, open water habitat that regularly inundates the surrounding vegetation. The increased diversity of aquatic habitat types currently accessible to fish communities has provided niches for numerous species from all life stages (mature, mature spawning, juvenile, young-of-the-year, and larval fish). The presence of these various life stages indicates that the functional capacity of the South Wetland now includes spawning, feeding, and rearing grounds for fish communities. In addition, this wetland has continued to develop, attracting and supporting new species including obligate wetland fish such as the eastern mudminnow (*Umbra pygmaea*), collected in 2003. Overall, the abundance and structure of this fish community clearly demonstrates that the South Wetlands have been successfully restored to a level where the aquatic habitat now functions as an integral part of fisheries development, diversity, and recruitment within the Christina River Watershed (DuPont CRG 2002c).

The dramatic change in vegetative cover types has resulted in habitat opportunities for a variety of migratory and resident bird species. In addition, the well-established fish and benthic communities provide a substantial food source for birds that now frequent the area. Where the original monotypic stand of *Phragmites* provided poor bird habitat, the current habitat provides space for all trophic levels of birds. Many of these birds rely on the wetlands for foraging, nesting, breeding, and shelter.

2.2 SUMMARY OF RESPONSE ACTIONS

In 1988, DuPont entered into an Administrative Consent Order (ACO) with the EPA to complete investigations for the Newport Site in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA). The site was included on the National Priorities List (NPL) in early 1990. A RI/FS was conducted in three phases between August 1988 and August 1992. In August 1993, a ROD that specified the remedial actions for seven operable units was issued. A summary of these units and the Selected Remedy is listed in Table 2-1.

DRAFT FINAL*Table 2-1 - Summary of ROD Requirements for DuPont Newport Site*

Unit	Selected Remedy	Purpose
Ballpark	Excavation of soil above 500 mg/kg total lead; disposal in North Landfill	Prevent exposure to elevated levels of lead
North Landfill and Wetlands	Capping; wetlands remediation, restoration and monitoring; waste pile stabilization and consolidation in the North Landfill; vertical barrier wall installation to the base of the Columbia aquifer; groundwater recovery and treatment	Prevent continued contaminant releases to the groundwater that discharges to the river and the North Wetlands; cleanup areas of unacceptable environmental impact in the North Wetlands; prevent exposure of plant and terrestrial life to contaminated soil
South Landfill	Excavation and consolidation of contaminated soil underneath and to the east of Basin Road or South James Street onto the South Landfill	Prevent continued contaminant releases to the groundwater that discharges to the Christina River and the South Wetlands; prevent unacceptable human exposure to the contaminated soil from the South Landfill
South Wetlands	Excavation; sediment disposal in the South Landfill; restoration; monitoring	Prevent unacceptable impact to environmental receptors
Christina River	Dredging; sediment dewatering and disposal in North or South Landfill; monitoring	Prevent unacceptable impact to environmental receptors
Ciba-Geigy and DuPont Holly Run Plants	Vertical barrier wall installation along the Christina River at the Ciba-Geigy Plant; paving the unpaved ground within the contaminated Plant Areas; recovery and treatment of the groundwater upgradient of the barrier wall; instituting special Health and Safety Plans (HASPs) for intrusive work	Prevent continued releases of contaminants to the groundwater that discharges to the Christina River; prevent unacceptable human exposure to contaminated soil
Groundwater	Monitoring; providing public water supply along Old Airport Road; establishing a groundwater management zone; invoking the ARARs Wavier	Prevent potential future human exposure to the site-related contaminated groundwater; prevent further contamination of the Columbia and Potomac aquifers; protect the South Wetlands

In 1994, DuPont submitted a Remedial Design/Remedial Action Work Plan, as directed by the ROD and ACO. Incorporated in this work plan was an initial value-engineering assessment that identified the most cost-effective implementation of remedies specified in the ROD that are also protective of human health and the environment. Pre-design investigations were outlined for the North and South Wetlands and the Christina River to delineate areas for

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sediment removal. A phased sampling strategy was developed and implemented to fulfill the ROD requirements. The ROD required delineation of three metals (cadmium, lead, and zinc) that were associated with the pigment manufacturing at Newport. Two sets of criteria were provided in the ROD: EPA site-specific sediment cleanup criteria (SSCC) and apparent effects threshold (AET) values. Sediment concentrations exceeding the SSCC in the sediments would need to be excavated, while sediment concentrations below the AET values could be left in place. Those concentrations detected between these two criteria may have required additional investigation.

Delineation investigation, remedial action and restoration of the wetlands and river areas were completed sequentially. The pre-design investigations for the wetlands were completed before the river. Remedial action and restoration was completed for the North Wetlands, followed by the South Wetlands, and then the Christina River. The actions are summarized below.

North and South Wetlands

Delineation investigations for the North and South Wetlands were completed between December 1994 and December 1995. Based on this data, the delineated excavation footprints were approved by EPA by February 1996. Excavation and restoration were completed in accordance with the approved 100 percent Design Plans for each of the wetlands (DuPont Environmental Remediation Services, 1997a and b).

As part of the restoration design, DuPont proactively evaluated and incorporated additional restoration options beyond those required in the ROD. As part of this process, DuPont met with representatives of the EPA, DNREC, NOAA and USFWS to define additional potential restoration options that would be considered valuable to the stakeholders. The identified restoration options were then evaluated using the Evaluation of Planned Wetlands (EPW) (Bartoldus, et. al, 1994) to develop a restoration plan that best balanced the different functions that the wetlands could potentially perform. The EPW was recommended by the USFWS for the Newport wetlands restoration as a tool to demonstrate overall habitat improvements compared to the pre-remediation condition (DuPont Environmental Remediation Services, 1997a and b, and DuPont CRG, 1998).

Implementation of the ROD requirements would have returned the wetland areas to their original baseline conditions. However, the additional restoration enhancements implemented above the ROD requirements, and developed with input of the stakeholders have resulted in the creation of a significantly improved habitat with markedly increased functional

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capabilities for several wetland functions. This increase in function was used by the Trustees to offset the injuries and service losses (the NRD) that were estimated for the Newport Site.

Restoration Options - North Wetlands

Remediation activities in the North Wetlands began in 1997 and restoration was completed in 1998. The EPA signed the Remedial Action Completion Report in June 1998. Maintenance and monitoring of the restoration began in June 1998 in accordance with the approved Maintenance and Monitoring Plan (DuPont CRG, 1998). The North Wetlands has passed its sixth year post restoration (1998 to 2003). Success metrics for vegetative cover, sediment stabilization, and invasive species were met within 3 years post-restoration. The site exceeds regional reference locations in terms of vegetative diversity and use by wildlife. Extensive data and information on the wetlands restoration progress has been collected from 1998 to the present as part of the annual and routine monthly inspections outlined in the Maintenance and Monitoring Plan (DuPont CRG, 1998) and Addendum (DuPont CRG 2002a).

As presented in DuPont Environmental Remediation Services 1997a, the North Wetlands remediation and restoration consisted of the following basic components that were not part of the ROD requirements:

- Stabilization of the river berm
- Shoreline erosion protection
- Sediment excavation to a greater depth and backfilling
- Construction of a water control structure
- Sediment stabilization with erosion matting
- *Phragmites* control program

Stabilizing the river berm and providing shoreline bank erosion protection improved the drainageway habitat, stabilized sediment, increased the amount of open water at high tide, improved water quality, and provided better forage and cover for fish and wildlife. More importantly, river berm stabilization will ensure long-term wetlands protection, and prevent the loss of the berm and the wetlands.

For excavation, the ROD required removing 1-foot of sediment from the wetlands. DuPont removed all sediment down to the marsh clay deposit layer (approximately 2 to 3 feet) to eliminate any potential future concerns of recontamination from sediments left in place. Removal of the additional material, in conjunction with the water control structure, allowed for a permanent pool of water to be a part of the final design. In addition, the design allowed

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the wetland to be inundated daily during high tide. Thus, this design creates a clean, permanent open water habitat that was not previously present.

The *Phragmites* eradication program consisted of spraying and burning, and physical destruction of the root mass. Increased saline circulation in the marsh is expected to exclude future invasion by *Phragmites*. Control of *Phragmites* and other invasive species helped promote colonization of the marsh habitat by a more diverse assemblage of native plants. A diverse plant assemblage provides for better animal forage and enhances the functional capacity of the restored marsh to support wildlife.

Restoration Options – South Wetlands

Remediation activities and restoration were completed in 1998 for the South Wetlands. The EPA signed the Remedial Action Completion Report in January 1999. Maintenance and monitoring of the restoration began in January 1999 in accordance with the approved Maintenance and Monitoring Plan (DuPont CRG, 1999). The South Wetlands has past its fifth year post-restoration (1999 to 2003). Success metrics for vegetative cover, sediment stabilization, and invasive species were met within the first three years post restoration. As with the North Wetlands, the South Wetlands exceeds regional reference locations in terms of vegetative diversity and use by wildlife. Extensive data and information on the wetlands restoration progress has been collected as part of the annual and routine inspections as outlined in the Maintenance and Monitoring Plan (DuPont CRG, 1999) and Addendum (DuPont CRG, 2002a).

The South Wetlands remediation and restoration were similar to that of the North Wetlands in that DuPont proactively included the following basic components that were above and beyond the ROD requirements in an attempt to optimize functions and values that could be provided by the restoration site (DuPont Environmental Remediation Services, 1997b):

- Sediment excavation to a greater depth and backfilling
- Hummock construction and planting
- Sediment stabilization with erosion matting
- Removal of berm
- South Pond enhancement
- *Phragmites* control program

As with the North Wetlands, DuPont exceeded the 1-foot sediment removal depth required by the ROD and removed all sediment down to the marsh clay deposit layer (approximately 2

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feet) to eliminate any potential future concerns of recontamination from sediments left in place. Portions of the berm, up to 11 feet in depth, were removed to create hummocks. The creation of the hummocks increased cover type diversity, and vertical stratification of the wetlands.

Erosion matting increased sediment stabilization and proved effective during severe storm events. The matting also facilitated the development of a substrate for colonization by benthic invertebrate fauna and vegetation.

Removal of the berm resulted in the opportunity to open the South Pond to tidal influence. The South Pond did not require remediation, however it was excavated down two feet to remove fine-grained sediments. It was also recontoured to provide a more gradual intertidal zone that was vegetated with emergent vegetation. Drainage features were also added to facilitate sufficient water storage between high-tide cycles and develop more of a direct access to improve the tidal exchange throughout the South Wetlands.

Control of *Phragmites* and other invasive species helped promote colonization of the marsh habitat by a more diverse assemblage of native plants. A diverse plant assemblage provides for better animal forage and enhances the functional capacity of the restored marsh to support wildlife.

Removal of the additional materials from the wetlands, berm and South Pond areas, in conjunction with the enhancement of drainage features, allowed for a significantly improved tidal habitat than previously was present. The increased tidal water storage and the daily inundation of the wetlands at high tide and the water exchange in the South Pond has increased the functional capacity for benthos, fish, birds and wildlife. These physical changes along with the *Phragmites* control program also minimized the amount of *Phragmites* in the South Wetlands.

Christina River

The Christina River study area consisted of 3.5 miles of river (1 mile upriver of the north drainageway, 0.5 mile along the site, and 2 miles down river of the site). The pre-design delineation investigation was completed between March 1995 and February 1996. Based on these data, five areas requiring remediation were identified. These areas were later consolidated into three areas (Area 1, Area 2/3, and Area 4/5). Removal of sediment from these Areas effectively lowered sediment contamination for the river (June 17, 1996 letter from DuPont to EPA). EPA approved the delineation in August 1996. Subsequent

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confirmation sampling for the remedial areas was conducted and submitted to EPA in October 1996. A Sediment Removal Value Engineering Workshop was held in May 1997. Additional sediment sampling was completed in December 1997 to support the remedial design. Excavation began in 1998 and restoration was completed in 1999. Maintenance and monitoring began in September 1999 in accordance with the approved Maintenance and Monitoring Plan. The EPA signed the Remedial Action Completion Report in February 2000.

All success metrics established for the Christina River Area were met within with the first few years of monitoring. All Areas remained stable with increases in vegetative cover and species richness. Natural recruitment of plants resulted in the successful establishment of a diverse emergent plant community. In 2003, DNREC activities on the Christina River resulted in the disruption of Area 4/5. A 10-foot wide mosquito control ditch was cut through the restoration site. Because this action was undertaken by the State, no corrective actions by DuPont will be required.

2.3 ASSESSMENT OF RESOURCE INJURIES AND COMPENSATION REQUIREMENTS

This section begins with an overview describing the Trustees' assessment strategy, including the approaches used to determine potential injury to specific resources affected by contaminant releases from the Site. The remainder of the section describes the approach used to estimate the ecological service losses and presents the results of these assessments. The term *ecological services* means the "physical and biological functions performed by the resource including the human uses of those functions. These services are the result of the physical, chemical, or biological quality of the resource" (43 C.F.R. § 11.14(nn)).

Injury Determination and Quantification

The Trustees' assessment of alleged resource injuries focused on identifying the injuries or losses of natural resources which were likely or known to have resulted from the Site contamination, including due to the remedies undertaken. Metals were the primary contaminants of potential concern (COPCs) at the Site for natural resource damage assessment purposes. These COPCs were found in sediments of the wetlands and river adjacent to the Site.

Using data and other information developed as part of the remedial investigation process and pre-design investigations, as well as information on these contaminants in the existing scientific literature and their own knowledge of and experience in freshwater tidal ecosystems, the Trustees assessed impacts to natural resources.

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The Trustees found that resources or resource services were injured and/or lost due to:

- The historic release of contaminants in certain areas of the Site,
- The migration of contaminants into the North and South Wetlands and the Christina River, and
- The excavation and capping undertaken as part of the remedy.

The Trustees then used this information to conservatively (in favor of the natural resources) estimate the total potential loss of discounted, wetland service acre-years represented by the natural resource injuries associated with the Site. The analysis does not address natural resource injuries or service losses that may have resulted from releases of contaminants into the Christina River and adjacent aquatic and semi-aquatic environments by any other party, however it is intended to include all natural resource injuries due to releases of contaminants that have come to be located within the confines of the study area, regardless of source.

Injury Assessment Strategy

The goal of this assessment is to determine the nature and extent of injuries to natural resources and to quantify the resulting resource and service losses, thus providing a technical basis for evaluating the need for, type of, and scale of restoration actions. As described above in Section 1.1, this assessment process is guided by the NRDA regulations under CERCLA (43 C.F.R. § 11). For the Newport Superfund Site, the Trustees pursued an assessment approach in cooperation with DuPont. Existing data collected was shared between DuPont and the Trustees resulting in time and/or cost savings. Moreover, efforts taken by DuPont in consultation with the Trustees prior to restorations and the resulting enhancements above the ROD-required restoration were considered by the Trustees as credits towards offsetting the NRDA. In addition, the cooperative NRDA approach avoids costly litigation and expedites the restoration of the environment.

The injury assessment process occurs in two stages: 1) injury evaluation and 2) resource and service loss quantification. To evaluate potential injury to resources, the Trustees reviewed existing information, including remedial investigation data, ecological risk assessments, and scientific literature. Based on information from all these sources and with an understanding of the function of the terrestrial and aquatic ecosystems at and near the Site, the Trustees evaluated injury to natural resources. The Trustees considered several factors when making this evaluation, including, but not limited to:

- the specific natural resource and ecological services of concern;

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- evidence indicating exposure, pathway and injury;
- the mechanism by which injury occurred;
- the type, degree, spatial and temporal extent of injury; and
- types of restoration actions that are appropriate and feasible.

For each resource category (either a group of organisms or a habitat type) that was potentially affected, the Trustees identified a pathway linking the injury to releases from the Site, determined whether an injury is likely to or has occurred, and identified the nature of the injury. To undertake this effort, an understanding of the important contaminants is necessary. The evaluation of the COPCs and their pathways to ecological receptors is described in the next two sections. Following the identification of the contaminants, it is possible to evaluate those resources that have been adversely affected by releases from the Site.

As a result of the cooperative NRDA approach, the Trustees used the data provided by DuPont to create a spatial representation of the locations of the contaminated areas by plotting the data on aerial photographs using a custom built personal computer based database and GIS package (NOAA Query Manager/MS Access/ArcView 3.3). Once the concentrations of contaminants in each habitat were plotted and the amount of affected acreage was determined for each habitat type, the Trustees used the peer-reviewed scientific literature and best professional judgments to develop estimates of the percentage of injury to each habitat. The Trustees focused the injury assessment from the entire Site and/or adjacent areas. The Trustees used the year 1981 to begin the calculation of time-based injury duration. The Trustees also made conservative estimations of the duration of the monitored natural recovery period for the individual areas based on contaminant concentration. If no remediation was conducted for a given area, for calculation purposes, it will remain injured in perpetuity.

Preliminary Restoration Strategy

This assessment was designed for injury assessment and restoration planning to occur simultaneously, utilizing a restoration-based approach. Under a restoration-based approach, the focus of the assessment is on quantifying the injuries and/or losses in natural resources and ecological services in ways that facilitate the identification of restoration projects that will compensate the public with the same level, type and quality of resources and ecological services that were lost. This restoration-based assessment approach is consistent with the CERCLA NRDA regulations, which allow restoration planning to be included as part of the

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Assessment Plan Phase where available data are sufficient to support their concurrent development (43 C.F.R. § 11.31).

Restoration Scaling Strategy

Habitat Equivalency Analysis (HEA), scientific literature, and knowledge of Delaware wetlands were used to determine how much credit could be realized from a restoration project, such as enhancing a degraded environment or preserving an existing environment. Various inputs are considered, such as the level of ecological services currently provided at the proposed location, the threat of destruction of the habitat by human encroachment and the potential for inundation. The analysis calculation shows how many discounted service acre years (DSAYs) can be credited for a given restoration project. The DSAYs are then converted to the amount of acreage that, if constructed at the Site, would be necessary for compensation for a specific type of habitat. If the project is preserved rather than constructed, the amount of acreage necessary for compensation usually increases.

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3.0 THE AFFECTED ENVIRONMENT

This section describes the physical, biological, and cultural environments in the vicinity of the Newport Superfund site. Resource areas described in this section correspond to the range of resource areas addressed in Section 5, "Restoration Alternatives Comparison." Resource areas addressed include wildlife, fish and invertebrates, essential fish habitat, threatened and endangered species, farmland and urban development, recreation resources, water and sediment quality, air quality, cultural resources, hazardous and toxic waste, and environmental justice.

This subsection provides additional information on the physical, biological and cultural environments in the area affected by releases of hazardous substances from the DuPont Newport Superfund Site and in which restoration action(s) contemplated in this Draft DARP/EA would occur.

3.1 THE PHYSICAL ENVIRONMENT

The Christina River Basin lies within the greater Delaware River Basin. The Christina River Basin drains portions of Pennsylvania, Delaware, and Maryland, and includes the Christina River (which eventually flows into the Delaware River in Wilmington, Del.), Brandywine Creek, White Clay Creek, and Red Clay Creek. These four major streams drain a 565 square mile area and provide more than 100 million gallons of water a day for more than half a million people in three states. The Christina River Basin provides 75% of the water supply for residents in New Castle County, Delaware, and more than 40% of the water supply for residents in Chester County, Pennsylvania. The upper two-thirds of the basin is situated in southeast Pennsylvania, while the downstream one-third is situated in northern Delaware. In addition to providing significant water supplies, the watershed also provides important wildlife habitat, recreational opportunities, and is a place of natural beauty for many to enjoy. In addition, the White Clay Creek is listed as a National Wild and Scenic River.

Rapid growth in areas within the watershed and, in part, from the cities of Wilmington and Philadelphia, is causing the Christina Basin to experience water quality concerns including nutrient pollution and the presence of toxic substances. The water quality and overall health of the Christina Basin is less than optimal because of a range in sources (i.e., municipal, industrial, and recreational use).

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3.2 THE BIOLOGICAL ENVIRONMENT

The Christina River supports a wide variety of anadromous, catadromous, and estuarine species (Miller personal communication 1990; Saveikis, personal communication 1990; Shirey, personal communication 1990). Blueback herring, alewife, white perch, striped bass, American eel, Atlantic menhaden, bay anchovy, and spot are species of particular interest to NOAA in the Christina and Delaware rivers due to their commercial importance or abundance. Alewife, blueback herring, and white perch spawn in the Christina River, and striped bass use it as a nursery area (Miller, personal communication 1990).

Juvenile life stages of estuarine-dependent species such as Atlantic menhaden, bay anchovy, and spot use the Christina River seasonally. The catadromous American eel is present throughout the entire Delaware basin, and uses a variety of habitats as adult foraging grounds (Shirey, personal communication 1990). Blue crabs are common in the Christina and Delaware rivers.

Blue crab, American shad, and striped bass are fished commercially in the Delaware River near its confluence with the Christina River. Important recreational fisheries for blue crab, American shad, striped bass, and white perch occur in the Christina River and in the lower reaches of the Delaware River (Miller, personal communication 1990). In addition, large freshwater fisheries on both rivers harvest channel catfish, largemouth bass, yellow perch, black crappie, and sunfish.

3.3 THE CULTURAL AND HUMAN ENVIRONMENT

Delaware is rich in cultural resources dating back to the 1600s when Sweden had settled in the area of the Newport Site. Cultural resource studies were prepared as part of the remedial investigation and prior to the remedial actions taken at the site to ensure that Delaware cultural resources were protected. Provided below is a summary of the cultural history of the Christina watershed area.

The Delaware Valley's earliest permanent Old World settlement began in 1638 when the *Kalmar Nyckel*, a Swedish warship landed at "The Rocks," a natural wharf in the Minquas Kill (soon renamed the Christina River). Settlers, under the command of Peter Minuit, former Dutch governor of New Amsterdam, met with local Lenni Lenape chiefs, signed a treaty, and founded the colony of New Sweden. The Europeans gained rights to the land along the western bank of the Delaware River, approximately 30 miles north and south of the mouth of the Minquas Kill and began Fort Christina.

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Agriculture and fur trading with Native American trappers were the first industries in the area. By the end of the 1600s mills for grinding corn and wheat had been established along the Brandywine River (Brandywine Village). With fertile land, abundant forests, and well-protected access to the Delaware River and the Atlantic Ocean, a center of milling, distribution, and shipbuilding was created.

In the late 1700s, paper and cotton mills were added to the Brandywine Village's existing flourmills. Fleeing the excesses of the French Revolution, Eleuthère Irénée du Pont de Nemours settled here in 1802, purchasing property along the Brandywine from the Hagley family and opening his black powder mill. From 1802 to 1921, these and other local mills produced powder for America's hunters, soldiers and construction projects. From these gunpowder mills sprang the modern chemical industry, which is still headquartered in Delaware—the DuPont Company, Hercules, Inc., and ICI Americas, however active facilities have greatly reduced in number.

Early in the 20th century, a business-friendly operating climate began to attract businesses to incorporate in Delaware. Today, the majority of Fortune 500 corporations are incorporated in The First State and the decisions of the state Court of Chancery wield national and international influence. In the 1980s, credit card banks also began moving here and Wilmington has become a major electronic banking center for America.

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4.0 INJURY AND SERVICE LOSS EVALUATION

4.1 PATHWAYS OF CONTAMINATION TO TRUST RESOURCES

A *pathway* is defined as the route or medium (for example, water or soil) through which hazardous substances are transported from the source of contamination to the natural resource of concern (34 C.F.R. § 11.14). For the Newport Site, historic disposal occurred within the landfills adjacent to the wetland areas. Surface migration via runoff and groundwater migration have contaminated sediments within sections of the North and South Wetlands, and specific areas within the study area for the Christina River. These pathways have resulted in the presence of contamination within areas utilized by wildlife and other ecological receptors of interest. Data collected during the RI/FS and pre-design investigations indicated that sediments were contaminated with several site-related metals.

4.2 CONTAMINANTS OF CONCERN (COCs)

Several metals were historically used on-site in the manufacturing of pigments. Cadmium, lead, and zinc were found to be the most prevalent and the focus of post-ROD activities to delineate areas for sediment removal. The Trustees determined that these and others associated with the manufacturing activities might have potentially injured the trust natural resources at the DuPont Newport Superfund Site. These metals were found in the wetland and river sediments at or near the Site at elevated concentrations (i.e., exceeding ecological benchmark concentrations.)

Lead

Although lead may be released into the environment from natural sources, most of the lead that occurs in aquatic systems has been released due to human activities. Depending on the form that is discharged, lead can remain dissolved in the water column or become associated with sediments upon release to aquatic systems.

Lead has been shown to be neither essential, nor beneficial to living organisms. While dissolved lead is not acutely toxic to aquatic organisms, longer-term exposure to relatively low levels of this substance may adversely affect the survival, growth, and reproduction of fish, invertebrates, and, to a lesser extent, aquatic plants. Exposure to elevated levels of sediment-associated lead may cause acute and chronic toxicity to sediment-dwelling

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organisms. In birds and mammals, dietary exposure to elevated lead levels can cause damage to the nervous system and major organs, reduced growth, impaired reproduction, and death.

Zinc

Zinc is released into the environment as a result of various human activities, including electroplating, smelting and ore processing, mining, municipal wastewater treatment, combustion of fossil fuels and solid wastes, and disposal of zinc-containing materials. In aquatic systems, zinc can be found in several forms, including the toxic ionic form, dissolved forms (i.e., salts), and various inorganic and organic complexes. Most zinc introduced into aquatic systems is partitioned into the sediments by sorption onto hydrous iron and manganese oxides, clay mineral and naturally occurring organics. While zinc can form associations with particulate matter and be deposited on bottom sediments, sediment-associated zinc can also be remobilized in response to changes in physical-chemical conditions in the water body.

The acute toxicity of dissolved zinc is strongly dependent on water hardness; however, chronic toxicity is not. While zinc is an essential element, long-term exposure to elevated dissolved zinc concentrations has been shown to adversely affect the survival, growth, and reproduction of fish, invertebrates, and aquatic plants. Exposure to sediment-bound zinc may cause reduced survival and behavioral alterations in sediment-dwelling organisms.

Cadmium

Cadmium is a relatively rare element that is concentrated in zinc-bearing sulfide ores. Compared to other metals, cadmium is relatively mobile in aquatic environments. Precipitation and sorption to mineral surfaces, hydrous metal oxides, and organic material are the most important processes for removal of cadmium to bed sediments. Adsorption and desorption are the most important factors in controlling the concentration of cadmium in water. Rates for adsorption and desorption are dependant on pH, redox potential, salinity, and sediment composition.

Long-term exposure to elevated dissolved cadmium concentrations has been shown to adversely affect the survival, growth, and reproduction of fish, invertebrates, and aquatic plants. Aquatic and terrestrial organisms bioaccumulate cadmium. Bioconcentration in fish depends on pH and the humic content of water. For vertebrates, accumulation of cadmium in the liver and kidneys can result from dietary exposure to elevated concentrations of cadmium.

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4.3 INJURY ASSESSMENT & FINDINGS

Injuries to the natural resources at the Newport Site were quantified by calculating the reduction in ecological services from the injured resource and loss of services resulting from releases of contamination at the Site. This quantification includes accounting for the time required for the injured resources to recover through natural or enhanced means to their pre-release condition.

The Trustee's assessment included site visits, presentations of remedial and restoration activities, review of annual maintenance and monitoring reports, and environmental data provided by DuPont. A Reasonably Conservative Injury Evaluation (RCIE) approach was used to assess potential injury that may have resulted from Site releases. The RCIE approach uses data from site investigations, literature values and a Habitat Equivalency Analysis, or HEA, to estimate natural resource injuries and the scale of compensatory restoration.

After reviewing the remedial investigation and ecological risk assessment for the site and evaluating entire site and adjacent areas, the Trustees focused on a number of specific habitat types for further assessment. These habitats were specific natural resource types (e.g., wetlands) that were utilized by natural resource species (e.g., benthic organisms, fish, birds). The habitats/operable unit combinations that underwent assessment included the remediated and unremediated wetlands, open water, riparian and riverine (Table 2-1).

The Trustees in collaboration with DuPont compiled a database of sediment chemistry and toxicity test results from environmental investigations of the Christina watershed using NOAA's Query Manager software (QM), a FoxPro relational database containing query tools (<http://response.restoration.noaa.gov/cpr/watershed/watershedtools.html#qm>). Metals associated with the Newport Site (i.e., cadmium, lead, zinc) were identified as exceeding relevant sediment quality guidelines (Buchman, 1998) in the North and South Wetlands and the Christina River and were therefore the COCs for this site.

To assess injury to benthos in the tidally influenced sediments affected by the Site, the Trustees used logistic regression modeling (Field et al, 2002). Site-specific toxicity data was spatially limited. Logistic regression modeling was applied to predict the probability of toxicity from the existing sediment chemistry concentrations measured at each station on the Site. QM was used to calculate logistical regression P-Max scores, where the P-max value is the maximum of the probabilities of toxicity of each modeled hazardous substance in the sample. Field (personal comm., 2001) developed a mathematical model based on a large dataset from coastal US habitats to predict mortality in *Ampelisca abdita*, a marine/estuarine

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shrimp-like amphipod that is an important food source for many fish species. For the purposes of this particular site evaluation, the Trustees and DuPont agreed that predicted mortality would serve as the estimated measure of injury to wetland benthos, i.e. if the P-Max score from the logistic regression model predicted that the probability of observing mortality of 40% of the amphipods at that sample station, then the service loss was set to 40% (Table 4-1). The Trustees then determined the total area-weighted average loss of wetland benthos services for each of the relevant habitat/operable unit combinations at the site.

Table 4-1 Logistic Regression Model – P-Max scores vs. predicted Ampelisca percent mortality (Field, 2001) and estimated percent Loss of Services (% LOS)

LRM P-Max Score	Predicted Ampelisca Mortality	% LOS
0.0 – 0.4	0.0-0.15	0%
0.4 – 0.5	0.15-0.20	18%
0.5 – 0.6	0.20-0.25	23%
0.7 – 0.8	0.25-0.30	28%
0.8 – 0.9	0.30-0.35	33%
0.9 – 1.0	0.35-0.40	38%

Habitat Equivalency Analysis Background

Habitat Equivalency Analysis, or HEA, (NOAA, 2000) is a calculation tool used to determine the amount of compensation (in the form of lost discounted service acre years (DSAYS)) needed to replace an injured habitat. The scale, or size, of a restoration project should be such that it provides enough ecological service gains to offset the total of the losses.

Losses are quantified as lost resource habitat area and ecological services. Restoration habitats of the same type, quality, and of comparable ecological value are usually chosen to compensate for the resource and service losses. This method allows scaling the value of the total loss to the value of restoration benefit. Restoration projects are scaled to provide comparable habitat resources and ecological services (equivalency) between the lost and restored habitat resources and ecological services.

In general, the HEA is a technique that balances “debits” (injured habitat or other) that have occurred as a result of releases of contaminants or hazardous substances against compensatory “credits” (habitat restoration projects) and uses a discount factor to account for

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the difference in time that the restoration services are delivered. Because the losses occur in different time periods, the relevant losses are not directly comparable. To make the losses that occur in different time periods comparable, a discount factor is applied to the losses to determine "discounted service-acre-years" or DSAYs (NOAA, 1999).

Habitat Equivalency Analysis Debit Model

Inputs to the HEA for the Newport Site were based on sediment chemistry analytical results and conservative assumptions¹. A number of generic assumptions were associated with all of the areas that were assessed: 1) the HEA is an appropriate assessment tool, 2) the discount rate is 3%, 3) the base year (the year from which a discount is applied) is the year 2003, 4) the onset of injury was calculated beginning in 1981, and 5) the date restoration was initiated varied for the various habitat types, ranging from 1996 to 2000. Other specific values used in the HEA debit model are shown in Table 4-2 - Habitat Equivalency Analysis debit input parameter values for Newport Site habitats

Onsite Restoration Credit

Prior to remediation, DuPont proactively evaluated and incorporated additional restoration options beyond those required in the ROD. As part of this process, DuPont met with representatives of the EPA, DNREC, NOAA and USFWS to define additional potential restoration options that would be considered valuable to the stakeholders. Consistent with the Trustees' preference for restoration at the site of the injury (onsite restoration), the Trustees identified potential restoration options to enhance the habitat value in portions of the North & South Wetlands Remediated Areas Habitat subsequent to remedial activities,

¹*The term "conservative assumption" indicates that the value of the parameter in question would tend to favor the natural resource and the public's interests in injured natural resources when used in the analysis. The assumed value therefore leads to an upper-end estimate of how much injury occurred or how much restoration is required. Often these assumptions are used in initial analyses to guide the Trustees in determining the appropriate level of effort to apply in obtaining more refined estimates. Sometimes, as is the case for most of the assumptions used in this injury assessment, the cost of developing refined estimates for parameters would exceed the potential reduction in the cost of restoration. In these instances, the use of conservative assumptions in the final analysis, rather than developing more precise point estimates, results in an overall cost savings to the potentially responsible parties (PRPs) while still protecting the public's interest in obtaining sufficient restoration for the injuries.*

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i.e., "onsite restoration", in addition to the remediation and site rehabilitation that the response agencies required. DuPont did the work with the understanding that service increases realized from the enhancements would be used in the future to offset some of the Site's natural resource service losses. To document maturation of the restored onsite wetlands, DuPont conducted its Evaluation of Planned Wetlands monitoring effort under EPA oversight (EPW URS, 2003).

The Trustees interpreted EPW monitoring scores and made the determination that the enhancements delivered approximately 40% additional resources and services. This number was generated based on selected quantitative measures of fish habitat improvement and increases in habitat diversity implemented at each of the areas (EPW URS, 2003). Credit calculations revealed that the enhancements to the North & South Wetlands Remediated Areas generated 36.4 and 78.64 DSAYs for a total of 115 DSAYs above the post remediation baseline condition, respectively.

Table 4-2 - Habitat Equivalency Analysis debit input parameter values for Newport Site habitats

<i>Input Parameter</i>								
<i>Assessment Area</i>	Riverine	Riparian	N Remediated Wetland	N Wetland unremediated	S Wetland Remediated	S Wetland Unremediated	Riverine Dredged Area	Open Water Remediated
<i>Habitat Equivalency Factor</i>	4.51:1	1	1	1	1	1	4.51:1	4.51:1
<i>Acres Injured</i>	88.78	0.922	2.431	2.699	5.412	9.383	4.01	1.684
<i>Levels of Ecological Services at Time of Injury (baseline)</i>	100%	100%	100%	100%	100%	100%	100%	100%
<i>Initial Level of Injury (LOS)</i>	23%	25%	29%	30%	38%	38%	38%	38%
<i>Years Until Recovery</i>	20	∞	3	20	3	3	3	3
<i>Restored Habitat Level of Ecological Services</i>	100%	100%	100%	100%	100%	100%	100%	100%

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Remediated Area Ecological Service Level after Recovery	100%	100%	100%	100%	100%	100%	100%	100%
Total Post DSAYs	760.8	43	22.1 (credit 36.4)	29.3	63 (credit 78.64)	129	4.0	20.5
Total Net Lost EqDSAYs	168.7		-14.3*	29.3	-15.3*	129	0.9	4.5

* - 40% increase in ecological function, over the post-remediation baseline condition, was achieved by construction of habitat enhancements to the N & S wetland areas.

Cross Habitat Comparison

Comparing DSAYs generated in different habitat types is complicated because of the different functions they may provide. A factor for relative habitat productivity was applied to allow comparison across habitat types. The Trustees decided that the habitat productivity of each area could be compared to the habitat productivity of a natural wetland. The Trustees reviewed the method used to develop a wetland conversion factor for the Lavaca Bay NPL Case (marsh equivalency factor; MEF, 4.51 acres of water bottom = 1 acre of tidal wetland) (Texas Trustees, 2000). Trustees, using their professional knowledge of local tidal ecosystems, decided that the same ratio could be used as a conversion factor for Delaware Bay wetlands because similar wetland functions were represented. Multiplying the "raw" DSAYs by the MEF converts the losses to comparable units, i.e., EqDSAYs. In the north and south on-site restoration areas, no conversion is necessary as these units are tidal marshes.

HEA Debit Model Result

The debit calculation included injuries to benthic resources in Riverine, Riparian, N Remediated Wetland, N Unremediated Wetland, S Remediated Wetland, S Unremediated Wetland, Dredged Riverine Area and the Open Water Remediated Areas (Table 4-2). Approximately 303 additional wetland equivalent DSAYs (net after crediting early onsite restoration) and 43 riparian corridor DSAYs are needed to compensate for injuries at the Newport Site.

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5.0 THE RESTORATION PLANNING PROCESS

5.1 RESTORATION OBJECTIVE

The overall objective of the restoration planning process is to identify restoration alternatives that are appropriate to restore, rehabilitate, replace or acquire natural resources and their services equivalent to natural resources injured or lost as a result of site-related contamination. The restoration planning process may involve two components: primary restoration and compensatory restoration. Primary restoration actions are designed to assist or accelerate the return of resources and services to their pre-injury or baseline levels. In contrast, compensatory restoration actions are actions taken to compensate for interim losses of natural resources and services, pending return of the resources and their services to baseline levels.

For the Newport Superfund Site, the remedial and restoration actions undertaken at the Site (e.g. excavation of contaminated sediment and wetland restoration) protect natural resources at, and in the vicinity of the Site, from further or future harm. Natural resources at the site have not only returned to pre-injury or baseline conditions within a reasonable period of time, but have been enhanced above former baseline conditions.

The objective of compensatory restoration under this Draft DARP/EA is provided by the underlying assessment: the enhancement and preservation of tidal wetland habitat to assure flows of ecological services into the future. These additional actions are provided to compensate for the service losses attributed to the former contaminant releases at the Newport Site.

In accordance with NRDA regulations, the Trustees identified and evaluated a reasonable range of project alternatives suitable to compensate for injuries and losses to tidal wetland, riverine, and riparian habitat in the Christina River watershed. These projects were identified by DNREC in consultation with a number of Delaware State agencies, and conservation groups. Because of the limited potential to timely implement projects within the Christina River watershed and New Castle County, potential projects were identified in other counties in the State of Delaware.

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The Trustees reviewed the available information and consulted with individuals with knowledge of these specific projects, including the potential benefits and feasibility of these alternatives. In identifying and evaluating these alternatives, the Trustees sought options capable of providing multiple benefits or services and the greatest overall benefit to the public. The Trustees used the criteria outlined below to carefully consider the restoration project alternatives identified. Each project alternative, the results of that evaluation and the restoration action that the Trustees have selected on the basis of that evaluation are identified below.

5.2 RESTORATION SELECTION CRITERIA

In accordance with the NRDA regulations, the following criteria were used to evaluate restoration project alternatives and identify the project(s) selected for implementation under this plan:

- *The extent to which each alternative is expected to meet the Trustees' restoration goals and objectives:* The primary goal of any compensatory restoration project is to provide a level and quality of resources and services comparable to those lost. Benefits of restoration actions need to be related or similar to the natural resource injuries and service losses at the Site. The Trustees evaluate the potential relative productivity of existing habitat and the likelihood that this habitat would exist in the future with the increased trends of societal development. Future management of the site is less of a consideration since a conservation restriction would preserve the habitat into the future. Some management may be necessary in the future as opportunities to increase ecological structure, diversity or service flows are identified.
- *The cost to carry out the alternative:* The benefits of a project relative to its cost are a major factor in evaluating restoration alternatives. Additionally, the Trustees consider the total cost of the project and the availability of matching funds. Factors that can affect and increase the costs of implementing the restoration alternatives may include project timing, access to the restoration site (for example with heavy equipment), acquisition of state or federal permits, and acquisition of the land needed to complete a project and the potential liability from project construction.
- *The likelihood of success of each project alternative:* The Trustees consider technical factors that represent risk to successful project construction, successful project function, or long-term viability of the restored habitat. For example, high rates of subsidence at a project site are considered a risk to long-term existence of constructed habitats. Alternatives that are susceptible to future degradation or loss through contaminant releases or erosion are considered less viable. The

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Trustees also consider whether difficulties in project implementation are likely and whether long-term maintenance of project features is likely to be necessary and feasible. Sustainability of a given restoration action is a measure of the vulnerability of a given restoration action to natural or human-induced stresses following implementation and the need for future maintenance actions to achieve restoration objectives.

- *The extent to which each alternative will avoid collateral injury to natural resources as a result of implementing the alternative:* Restoration actions should not result in additional losses of natural resources and should minimize the potential to affect surrounding resources during implementation. Projects with less potential to adversely impact surrounding resources are generally viewed more favorably. Compatibility of the project with the surrounding land use and potential conflicts with any endangered species are also considered.
- *The extent to which each alternative benefits more than one natural resource or service:* This criterion addresses the interrelationships among natural resources, and between natural resources and the services they provide. Projects that provide benefits to more than one resource and/or yield more beneficial services overall, are viewed more favorably. For example, although recreational benefits are not an explicit objective in this Draft DARP/EA, the opportunity for a restoration project to enhance recreational use of an area was considered favorably.
- *The effect of each alternative on public health and safety:* Projects that would negatively affect public health or safety are not appropriate.

The NRDA regulations give the Trustees discretion to prioritize these criteria and to use additional criteria as appropriate. In developing this Draft DARP/EA, the first criterion listed has been a primary consideration, because it is key to ensuring the restoration action funded by the Trustees will compensate the public for injuries to resources attributed to Site releases, consistent with the assessment of compensation requirements for the Site. The evaluation of projects according to the criteria involves a balancing of interests to determine the best way to meet the restoration objective.

The Trustees also recognized the importance of public participation in the restoration planning process, as well as the acceptance of the projects by the community. During the development of the alternatives list, community and conservation groups were contacted to solicit ideas for projects. Alternatives were considered more favorably if complementary with other community development plans/goals.

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NEPA and the NRDA regulations required the Trustees to evaluate the "No Action" alternative, which for compensatory restoration equates to "No Compensation." Under this alternative, the Trustees would take no action to compensate for interim losses associated with the evaluated natural resources.

5.3 RESTORATION CREDIT – NEWPORT NORTH AND SOUTH WETLANDS

Implementation of the ROD requirements would have returned the Newport Superfund Site wetland areas to their original baseline conditions. However, the additional restoration enhancements developed with input of the stakeholders (i.e., Trustees) and implemented by DuPont resulted in the creation of a significantly improved habitat with markedly increased functional capabilities, and ecological services above baseline conditions. Remediation of the North and South Wetlands began in 1997/98 and the enhanced wetlands are past their sixth year post-restoration. Table 5-1 summarizes the input parameters for giving service credit for the wetlands enhancements. The result of the analysis was that 115 DSAYs (credit) have accrued from the restoration action.

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Table 5-1 - HEA input parameters for Newport Wetlands Restoration Enhancement (early, onsite implementation)

Replacement Habitat Type	North Wetlands	South Wetlands
Initial level of ecological services	50	25
Year creation/replacement project starts	1997	1998
Year ecological services start increasing	1998	1998
Year in which maximum ecological service level is reached	2001	2001
Maximum ecological service level	100% (recovery) + 40% enhancement	100% (recovery) + 40% enhancement
Shape of recovery function	Linear	Linear
Expected length of service increase	Perpetuity	Perpetuity
DSAYS	36.4	78.6
TOTAL DSAYS	115.0	

5.4 FIRST TIER SCREENING OF RESTORATION ALTERNATIVES

Because this NRDA was undertaken in a cooperative manner, the Trustees and DuPont first developed a list of potential alternatives for consideration to compensate for service losses at or adjacent to the Newport Superfund Site. The Trustees also listed questions that were used as comparison criteria to evaluate the alternatives. A number value was assigned for the responses to the questions. These values were summed to provide an overall total score. Similar to those listed in Section 4.2, the list of screening criteria used included:

- Timing –There was a preference for restoration projects that could be implemented in the short term (1-3 yrs). In addition, the timeframe for the alternative itself needed to be considered. Several projects needed to be implemented in a short timeframe (weeks - months) and this timeframe conflicted with the DARP/EA process.

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- In-Kind Restoration – There was a preference for restoration projects with a strong nexus to the respective service losses. Projects within the Christina River watershed associated with tidal or freshwater wetlands, riverine habitat, or the potential to improve water quality were considered more favorable.
- High Likelihood of Success – There was a preference for the restoration projects that had a high likelihood of success. The Trustees and DuPont favored projects that didn't require extensive initial investigation to determine if a project was feasible, or those that required extensive maintenance and monitoring into the future.
- Limiting Disruption to Existing Resources – The preference was for restoration projects that did not disrupt existing resources. Removal of existing mature habitat (i.e., forest) to create a different, and less mature habitat (i.e., wetlands) was not considered favorable. Additionally, the preference was to leave the onsite primary restoration undisturbed.
- Long-term Benefit for the State – The Trustees are interested in alternatives that would provide long-term benefit to the people of Delaware. Many rural and forested areas of Delaware are threatened by housing and/or commercial development. Losses of such valuable land through development have been quantified and show an alarming increase over time. The Trustees acknowledge the value of preserving land near or adjacent to State-owned wildlife areas that are threatened by development. These properties provide high functioning ecological services or have the capacity to be developed to provide diverse, high functioning ecological services.

With the use of the screening criteria, the Trustees eliminated many of the restoration alternatives. Many of the initial alternatives were inappropriate because of the uncertainty about timely implementation. Some projects were too large and not scaleable to the needs of these assessment and restoration effort. The results of the preliminary screen are presented in Table 5-2.

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The Trustees have approached restoration planning with the view that the injured natural resources/lost services are part of an integrated ecological system and that the greater

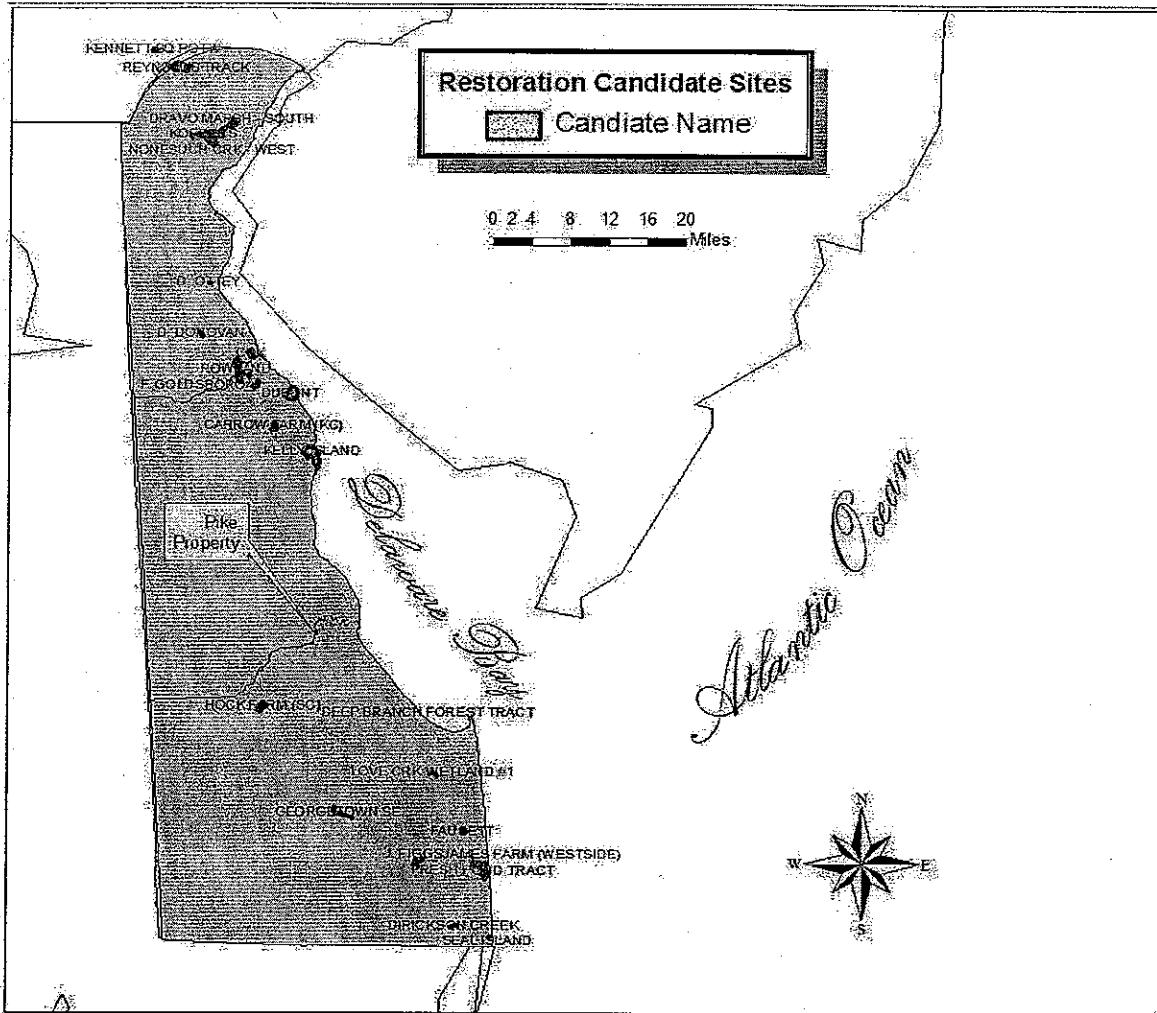


Figure 5-1 Restoration Candidate Project Locations

Delaware River Estuary (including the Christina River) represents the relevant geographical area for siting restoration actions. For those alternatives involving wetlands restoration/enhancements in the Christina River watershed (i.e., Dravo Marsh, Nonesuch Creek Marsh), the existing information suggested that extensive investigation and cleanup would be necessary, limiting restoration feasibility in those areas due to concern about sediment contamination. Therefore, restoration opportunities within the preferred Christina River sub-watershed and nearby areas within the estuary were not feasible.

Selecting restoration opportunities outside the Christina sub-watershed was considered a reasonable and equivalent alternative because of the life history requirements of the natural

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resources injured by the site. The life history of several of the highly valued natural resources such as blue crab, Atlantic herring, spot, and striped bass require the use of the entire Delaware estuary and its rivers (e.g., the Christina and Mispillion Rivers) as spawning and nursery area. For example, after mating blue crab females migrate to the lower estuary to release larvae on the out going tide where they drift out to sea to feed and grow. After they have molted through zoeal and megalopal stages, blue crab juveniles, "first crabs", gradually migrate into shallower, less-saline waters in upper estuaries and rivers, where they grow and mature (Hill et al., 1989). Similarly, Atlantic herring and spot spawn offshore and move into coastal rivers to grow. Atlantic shad is one of the few species to exhibit spawning site fidelity, i.e., return to their natal streams to breed. Most of the target resources use the whole estuary, such as herring, spot, blue crab, and striped bass and therefore will benefit from improved habitat within the larger watershed, not just the Christina sub-watershed.

The goal of the first tier screening process is to identify and implement prompt and cost-effective restoration actions. To meet this goal, the restoration benefits must be an appropriate link to the natural resources and resource service losses at the Site. To ensure this proper nexus, the Trustees must determine that the preferred restoration alternative has an ecological and a geographical relationship to injured resources and lost services. As stated earlier, the Upper Delaware Estuary, including the Christina River, is considered to be the appropriate geographic/ecological unit. The Trustee preference is to perform on-site restoration. On-site restoration with enhancements has already been complete. However, additional in kind projects in the lower Christina River were not favored because contamination issues remain and it is uncertain when site investigations and response decisions will be made.

Table 5-2 - Potential Restoration Alternatives- Screening Results (Bold → tier 2)

Restoration Alternative	Timing? (1-3 years)	In Kind Restoration?	High Likelihood of Success?	Limited Disruption to Environment?	Long-term benefit to State?	Retain for detailed analysis?
Junk Yard Alley - restore habitat for ecological receptors	N	Y	Y	Y	Y	N
Dravo Marsh - restore habitat for ecological receptors	N	Y	N	N	Y	N
Nonesuch Creek - restore habitat for ecological receptors	N	Y	N	N	Y	N
Christina Tide Lands, Calvin Tract – ownership/conservation easement	N	N	Y	Y	Y	N

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Restoration Alternative	Timing? (1-3 years)	In Kind Restoration?	High Likelihood of Success?	Limited Disruption to Environment?	Long-term benefit to State?	Retain for detailed analysis?
Remaining DuPont Newport South Wetland Marsh –enhancement	Y	Y	Y	N	Y	Y
Bog Turtles – ownership/conservation easement	Y	N	Y	Y	Y	N
Phragmites Control – improve/restore wetlands statewide	N	N	N	N	Y	N
Reynolds Tract DNS ownership/conservation easement	N	N	Y	Y	Y	N
Auburn Heights DNS ownership/conservation easement	N	N	Y	Y	Y	N
Pennsylvania Auburn Heights DNS ownership/conservation easement	N	N	Y	Y	Y	N
Walter Carpenter Park Tract, DNS – ownership/conservation easement	N	N	Y	Y	Y	N
Capano Property Tract, DNS – ownership/conservation easement	N	Y	Y	Y	Y	N
Kennett Waste Water Treatment Plant (WWTP) - Point source removal/stream cleanup/100 acres for drip irrigation	Y	N	Maybe	Y	Y	Y
Manure Management Watershed RCVA - help cleanup streams/wetlands	N	N	Y	Y	Y	N
Artesian's Churchman's Forest – ownership/conservation easement	N	N	N	Y	Y	N
Endowment to DNS, RCVA, BVA - conservation easements	N	N	Y	Y	Y	N
Hock Farm (Prime Hook) – ownership/conservation easement	N	N	N	N	Y	N
Deep Branch Forest (Prime Hook) – ownership/conservation easement	N	N	Y	Y	Y	N
Kelly Island (Bombay Hook) – ownership/conservation easement	N	Y	N	N	Y	N

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Restoration Alternative	Timing? (1-3 years)	In Kind Restoration?	High Likelihood of Success?	Limited Disruption to Environment?	Long-term benefit to State?	Retain for detailed analysis?
Carrow Tract (Bombay Hook) – ownership/conservation easement	Y	Y	Y	Y	Y	Y
Gladfelter Pulp Wood Co. – ownership/conservation easement	N	N	Y	N	Y	N
Bread and Cheese Island (NCC) – ownership/conservation easement	N	Y	Y	Y	Y	N
Rowland Tract – ownership/conservation easement	N	N	Y	Y	Y	N
Elmer Cox Tract (NCC) – ownership/conservation easement	N	N	Y	Y	Y	N
Benjamin Cataldi – ownership/conservation easement	N	Y	N	Y	Y	N
Fred Goldsboro #1 – ownership/conservation easement	N	Y	Y	Y	Y	N
Margaret Goldsboro – ownership/conservation easement	N	Y	N	N	Y	N
Fred Goldsboro #2 – ownership/conservation easement	N	N	Y	Y	Y	N
Fred Goldsboro #3 – ownership/conservation easement	Y	Y	N	N	Y	N
Carol Simpson – ownership/conservation easement	Y	N	N	Y	Y	N
Red Clay Valley - Heavy Equipment cleanup of floodplain	N	N	Y	N	Y	N
City of Newark - Restoration of upper Christina River	N	Y	Y	Y	Y	N
David Donovan – ownership/ conservation easement	N	N	Y	Y	Y	N
Pike Property – Crab, fish & wildlife habitat improvements & conservation easement	Y	Y	Y	Y	Y	Y
No Action	N	N	N	N	N	Y

* no action is retained per restoration planning and NEPA analysis requirements

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5.5 SECOND TIER - EVALUATION OF RESTORATION ALTERNATIVES

Five alternative restoration projects retained for further evaluation in Tier 2 included: enhancement in the Dupont South Wetland marsh; upgrading the Kennett WWTP; acquisition and preservation of the Carrow Tract near Bombay Hook NWR; acquisition and preservation of the Cox Property, acquisition, enhancement and preservation of the Pike Property, and the No Action alternative. This evaluation eliminated several of the remaining alternatives. The Newport South Marsh was not considered a viable alternative because the restored Newport South Wetlands would be disturbed by the restoration activities. Restoring the remainder of the South Wetland marsh would have a high likelihood for success; however the associated high costs would result in limited incremental benefit to the resources. Following the successful restoration of the South wetlands, increasing the acreage of quality wetlands by a small amount would provide little benefit to the State as a whole.

The Kennett Wastewater Treatment Plant is located in Kennett, Pennsylvania just above the Delaware-Pennsylvania border. Improving the quality of treated wastewater would directly benefit the Red and White Clay Creek watersheds that receives this discharge and then flows into the Christina River. Reducing nutrient loading and discharge volume from the Kennett Wastewater Treatment Plant would indirectly benefit the tidal wetlands of the Christina River Watershed by improving surface water quality. However, the treatment plant upgrade is too costly and there is no guaranteed start time. Multiple funding sources and the timing of availability additionally would complicate implementation of this option. Timing, cost, and other complicating factors, eliminated this alternative from further consideration.

Within the State of Delaware, the creation and expansion of highways has increased the demand for land along these thoroughfares. Much of the land that was once rural and forested is now a complex of residential and commercial tracts. Trends over the past decade have shown an alarming rate of development in Delaware, particularly southern New Castle County. NOAA analyzed land use data in this area (<http://www.udel.edu/FREC/spatlab/>). Due to the high rate of irreversible development revealed by the analysis, the State of Delaware and the other Trustees acknowledge the value of preserving land near or adjacent to State-owned wildlife areas that are threatened by development. These adjacent properties provide high functioning ecological services or have the capacity to be developed to provide diverse, high functioning ecological services. Several restoration alternatives retained for further evaluation consisted of these privately owned properties near or adjacent to State-owned property. The Carrow, Pike, and Cox Properties (Table 5-2) were selected for further consideration. However, only the Pike Property was currently available and had high interest

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from the property owner. The alternatives are evaluated separately and summarized in Table 5-3.

Table 5-3 - Summary - Trustees' Evaluation of Restoration Alternatives

Restoration Alternative	Consistency with Restoration Objective (incl. future management)	Likelihood of Success (incl. technical feasibility)	Cost of Restoration	Avoid - Minimize Resource Injury	Maximize Resource Benefits	Effect on Public Safety
Pike Property Phragmites Eradication	+	+	++	0	+	0
Pike Property Shoreline stabilization	++	++	-	0	++	0
Pike Property Circulation Improvements	++	++	0	+	++	0
Elmer Cox Tract (NCC) ownership/conservation easement Preservation & Restoration	+	-	-	+	+	0
Kennett Waste Water Treatment Plant - Point source removal/stream cleanup/100 acres for drip irrigation	+	0	-	++	0	+
Remaining DuPont Newport South Wetlands Marsh – enhancement	+	+	-	-	+	0
Carrow Tract (Bombay Hook) – ownership/conservation easement	+	-	-	+	0	0
No Action	-	0	++	0	0	0

Legend for Table 5-3

++	Very positive
+	Positive
0	Neither Positive or negative
-	Negative
--	Very Negative

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5.6 PREFERRED RESTORATION ALTERNATIVE – PIKE PROPERTY RESTORATION AND EASEMENT

Consistent with CERCLA NRDA regulations and NEPA, the selection of the restoration alternative will be finalized following public review and comment on this Draft DARP/EA. Information supporting the Trustees' selection of this preferred restoration alternative is provided throughout the remainder of this Section.

The preferred restoration project includes upland and emergent tidal wetlands on a privately owned 56-acre property located on the Kent and Sussex county line, approximately 55 miles down Delaware Bay from the Christina River. The property is situated along the Mispillion River, which flows generally eastward from Milford, DE into the Delaware Bay. During the first half of the 20th century, the Mispillion River served as a vital transportation route for commerce moving to and from Milford. In an effort to improve navigability, the U.S. Corps of Engineers conducted dredging activities in the 1930s to straighten, widen, and deepen the river's channel. By changing the river's morphology, the interior wetland portion of a river meander, including the property, was eroded by a heavily used navigation and floodwater conveyance channel. Over time, this has caused shoreline erosion on the western side of the property and a decline in hydraulic tidal flow in the project area. The decline in tidal flow has negatively impacted fish function and led to a significant reduction in the channel footprint of an oxbow that was created as a result of the dredging work. At low tide, there is relatively little water in the oxbow. The preferred alternative includes invasive species removal, shoreline stabilization, and tidal exchange improvements all under the long-term protection of a perpetual conservation easement held by a trustee. The CE will be held by the state.

5.7 THE PIKE PROPERTY

History and Description

The 56-acre property is located near Milford, Delaware on the Mispillion River. The Mispillion River connects several inland ponds and streams to the Delaware Bay ten miles east of Milford, and divides Kent and Sussex Counties. This section of the River is tidal with an exchange of approximately 4 feet. Historically, the Mispillion had a wider flood plain and wetlands system, but the banks have been filled in and the river channelized. In the 1930s, the U.S. Army Corps of Engineers (COE) channelized this section of the River, cutting-off the meanders or oxbow from the newly straightened mainstem.

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The Pike property consists of one of the River's original meanders (Figure 5-2). The site is located on the eastern, or right bank of the River with approximately 1,960 feet of frontage. A small area (0.5 acres) is located on the northern or left bank consisting of approximately 370 feet of frontage. The site is divided into three sections and an open water area (Figure 5-2): 1) North of the oxbow (15 acres) consists of marsh and 4.5 acres of forest; 2) Central oxbow consists of 22 acres of marsh; 3) North bank consists of 0.5 acres of marsh; and 4) the Oxbow which consists of 8 acres of open water and aquatic bed habitats. The main feature of the site is the 41.5-acre tidal marsh and oxbow. The remainder of the site is predominately deciduous riparian forest and freshwater wetlands with palustrine emergent marsh (PEM), forested (PFO1), and scrub/shrub (PSS1) National Wetlands Inventory (NWI) habitat classifications.

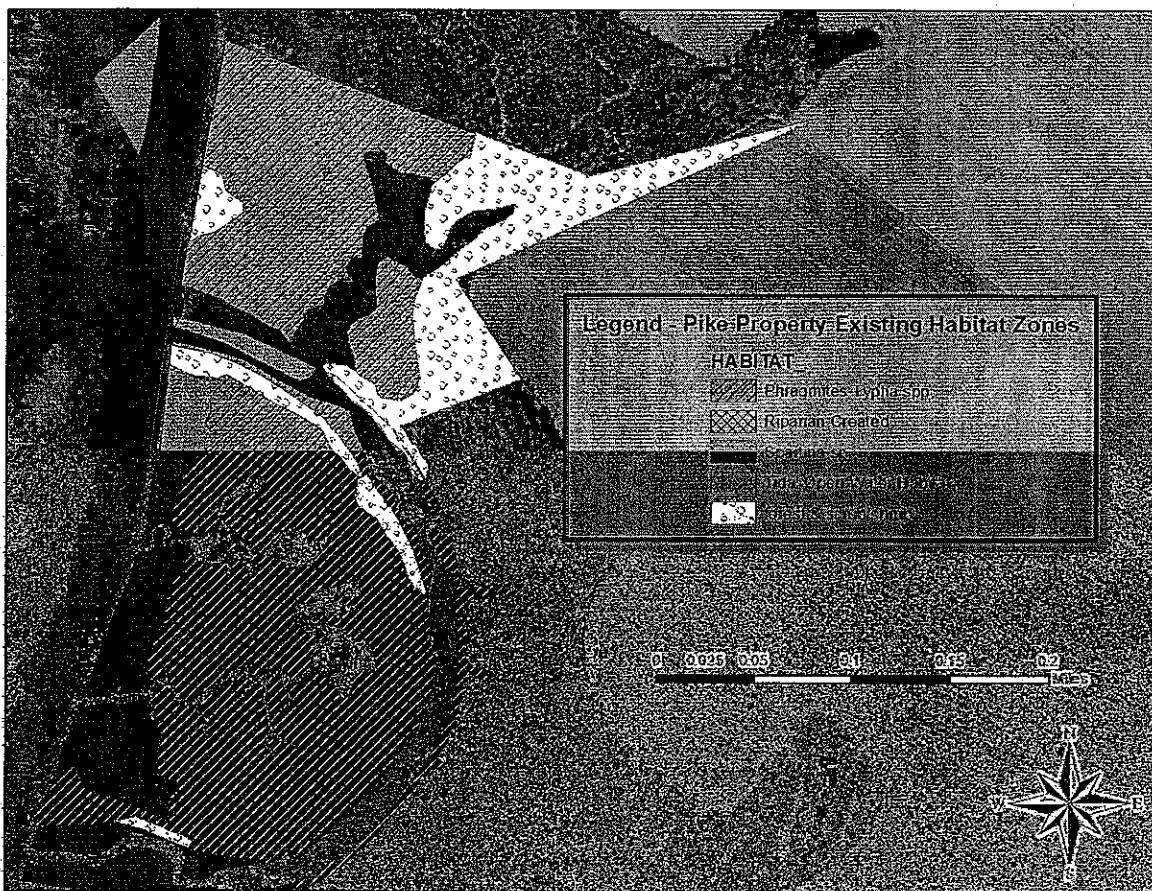


Figure 5-2- Pike Property, Existing conditions.

Reduction in tidal flow has caused the sedimentation of the interior portion of the oxbow until it is no longer navigable. Saltwater has been replaced by freshwater supporting the spread of the invasive reed *Phragmites*. Approximately a third of the property is currently

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covered in *Phragmites*. Because of the boat traffic and a lack of woody vegetation, the riverbank is eroding. Several feet of shoreline are now gone.

Easement and Restoration Options:

A perpetual easement will be purchased from the landowner. The landowner will maintain ownership of the property until restoration activities are completed. Once restoration is completed, the easement will be transferred to the Delaware Fish and Wildlife, however, the landowner will be permitted to reside on and hunt on the property until his death.

Restoration activities proposed for this site include:

Shoreline Stabilization

This section of the Mispillion River is experiencing substantial erosion. There is a more significant loss on the eastern bank of the River because of the softer substrate and lower elevation resulting when the USACE exposed the interior marsh to forces in the new channel. Erosion of the shoreline is caused by a combination of gradual channel migration toward the east and boat wake/wave action. This was determined by cross-sections that show a gradual slope from the vegetated marsh surface toward the main channel.

Alternative shoreline stabilization measures were evaluated, including sheet pile wall, riprap, and rock groins, but it was determined that such intensive engineering was not needed. Instead, a less intrusive, bioengineering method was chosen. The preferred method involves placing coir logs (made of coconut fiber) rows of 2 or 3 along the 2,238-foot shoreline. Sediment will accrete between and behind the logs where *Spartina alterniflora* will be planted. The resulting *Spartina* stand will reduce erosion and provide a diversity of habitat. Riparian areas adjacent to the oxbow channel will be enhanced with native trees and shrubs. Wave dampening fence (along the entire shoreline) will be installed to further reduce erosion and protect the restored shoreline for the first year.

Vegetation Planting and Management

Spartina will be planted in the tidal marsh areas and a mixture of herbaceous and woody vegetation (e.g. Saltbush, *Baccharis halimifolia*) will be planted on the upland areas. This vegetation will provide habitat and food for birds and other wildlife. *Phragmites* is a highly invasive emergent plant species of little value to wildlife. Its ubiquitous presence throughout the northern Delaware basin has significantly degraded the functions and values of many of region's wetland resources. A fundamental restoration objective is to

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increase the diversity and abundance of other beneficial vegetative species, such as Spartina, through control of *Phragmites*. To reduce *Phragmites* density, the landowner sprayed an herbicide, glyphosate, for 3 years and burned the dead plants. *Phragmites* will continue to be controlled by increases in salinity “spiking” resulting from improvements to the hydraulic efficiency of channels. Additionally, *Phragmites* root mats will be macerated using a “cookie cutter” dredge head.

Fish Habitat and Tidal Exchange

Channelization of the river and subsequent sedimentation within the oxbow has cut off the oxbow from tidal flushing. Opening the oxbow to tidal flushing and increasing the amount of tidal flushing to the interior will enhance the habitat by 1) providing increased nursery, foraging, and cover habitat for critical fish and shellfish species that inhabit the area 2) improving water circulation and nutrient exchange; and; 3) controlling the growth of *Phragmites*; Tidal flushing will be accomplished using Open Marsh Water Management (OMWM) techniques that have been used extensively in Delaware. These techniques involve cutting channels into the marsh using a rotary excavator and creating shallow pools. The depth and location of these channels will be identified through a hydrologic survey of the marsh and the river.

OMWM will be implemented using equipment that cuts into the marsh and broadcasts a thin layer of sediment and water over the marsh surface. The proper use of this method provides for the disposal of the excavated material over a wide area without changing the upper elevation of the marsh. It is important not to raise the elevation significantly because it will interfere with the tidal exchange and exacerbate the colonization of the marsh by *Phragmites*.

5.8 SCALING THE PREFERRED RESTORATION PROJECT

Habitat Equivalency Analysis Credit Model

The Trustees evaluated the preferred habitat restoration projects (above) to determine the credit that would potentially be generated by the actions proposed to be undertaken at the Pike Property. Using these assumptions, the Trustees used HEA calculations to determine the number of DSAYs given by each component of the restoration at the preferred site (Table 5-4).

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Table 5-4 - DSAY Credit that will be produced by the Pike Property Enhancements

Enhancement Area	Increase in Service Flow	Acres	DSAYS
Riparian Enhancement	10%	6.7	22
Riparian Creation	100%	0.9	22
Phragmites-dominated converted to Spartina marsh	35%	24.7	284
Enhancement of existing Spartina Marsh	10%	6.6	21
Enhancement of Open water Habitat (oxbow)	5%	9.0	4

In total 303 wetland EqDSAYS (all habitats combined) and 43 riparian habitat DSAYS were lost. Thus, the credit analysis conducted by the trustees indicates that the preferred restoration options when constructed will provide sufficient compensatory credit.

5.9 SUMMARY OF SETTLEMENT

The settlement of natural resource damage claims will be embodied in a consent decree among the United States, Delaware and DuPont (United States of America and the State of Delaware v. DuPont) (the “Consent Decree”). This Draft DARP/EA recommends a conservation easement, and the provision for restoration / enhancement funding as the preferred alternative(s) as part of a settlement of natural resource liability. The settlement of these natural resource damage claims will be embodied within the Consent Decree.

Pursuant to the settlement, DuPont will purchase the conservation easement. Furthermore, DuPont will provide funding to the Trustees to undertake the restoration actions described as the preferred alternative. DuPont will monitor the success of the compensatory restoration and undertake course corrections pursuant to an agreed upon monitoring plan.

5.10 GEOGRAPHIC PROXIMITY OF PROJECTS

Geographically, all of the restoration alternatives are within the Delaware Bay watershed.

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6.0 NEPA, ENDANGERED SPECIES ACT, & ESSENTIAL FISH HABITAT: ANALYSIS AND PRELIMINARY FINDING OF NO SIGNIFICANT IMPACT

Pursuant to the National Environmental Policy Act (NEPA), 42 U.S.C. § 4371, *et seq.*, and the implementing regulations at 40 C.F.R. Parts 1500 - 1517 (the NEPA regulations), federal agencies contemplating implementation of a major federal action must produce an environmental impact statement (EIS) if the action is expected to have significant impacts on the quality of the human environment. NEPA defines the human environment comprehensively to include the "natural and physical environment and the relationship of people with that environment" (40 C.F.R. § 1508.14). All reasonably foreseeable direct and indirect effects of implementing a project, including beneficial effects, must be evaluated (40 C.F.R. § 1508.8). Federal agencies may conduct an environmental assessment (EA) to evaluate the need for an EIS. If the EA demonstrates that the proposed action will not significantly impact the quality of the human environment, the agency issues a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required.

Section 1508.27 of the NEPA regulations describes the minimum criteria that federal agencies should consider in evaluating the potential significance of proposed actions. The regulations explain that significance embodies considerations of both context and intensity. In the case of site-specific actions such as those proposed in this Draft EA/RP, the appropriate context for considering significance of action is local, as opposed to national or worldwide.

With respect to intensity of the impacts of the proposed restoration action, the NEPA regulations suggest consideration of ten factors:

- likely impacts of the proposed project,
- likely effects of the project on public health and safety,
- unique characteristics of the geographic area in which the project is to be implemented,
- controversial aspects of the project or its likely effects,
- degree to which possible effects of implementing the project are highly uncertain or involve unknown risks,

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- precedential effect of the project on future actions that may significantly affect the human environment,
- possible significance of cumulative impacts from implementing this and other similar projects,
- effects of the project on National Historic Places, or likely impacts to significant cultural, scientific or historic resources,
- degree to which the project may adversely affect endangered or threatened species or their critical habitat, and
- likely violations of environmental protection laws.

40 C.F.R. § 1508.27. These factors, along with the federal Trustees' preliminary conclusions concerning the likely significance of impacts of the proposed restoration action, are discussed in detail below.

6.1 LIKELY IMPACTS OF THE PREFERRED ALTERNATIVES (PIKE PROPERTY RESTORATION AND EASEMENT)

Nature of Likely Impacts

The proposed restoration action for injuries to natural resources at the Site consists of coastal marsh habitat enhancement and restoration along with creation of riparian habitat. The tidal circulation enhancements and shoreline stabilization at the Pike tract would generally benefit the low salinity tidal ecosystem within the lower Mispillion River by providing increased nursery, foraging, and cover habitat for critical fish and shellfish species that inhabit the area. Increased habitat support for birds and other wildlife species would also benefit recreational uses of the area.

Marsh restoration and shoreline bio-stabilization at the Pike tract would result in some impacts to existing habitats, such as open water and unvegetated, subtidal sediments. Marsh restoration provides many similar services as unvegetated sub-tidal sediments, but is a much more productive habitat and would result in additional services. Wetlands provide a source of organic carbon, which supplies needed energy to support the estuarine food web.

Wetland enhancement as proposed would result in a net improvement to about 60 acres of existing wetland habitat. Currently the DNREC is using chemical herbicides to control undesirable freshwater wetland vegetation. However, the need for chemical control will be reduced by the influx of salt water made available through the proposed water control structures. In addition, the diversity of the wetland vegetation would increase resulting in a richer habitat to support wildlife.

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Effects on public health and safety

The Trustees do not expect the tidal circulation enhancements and shoreline stabilization to have any impacts on public health and safety. The habitat improvement that would result from implementation of the restoration project would not present any unique physical hazards to humans. No toxic discharges would be associated with the tidal circulation enhancements and shoreline stabilization. Efforts will be taken to minimize any sediment releases during construction.

Unique characteristics of the geographic area

Open water, unvegetated subtidal benthic sediments, and emergent marsh are degraded because of the ongoing erosion of the shoreline and the invasive growth of phragmites. These habitats are not unique to the Mispillion River near Milford. Degraded marsh and open water are displacing highly functional wetland habitat resulting in a net loss of habitat productivity. Therefore, no unique or rare habitat would be destroyed due to restoration of wetlands to those areas that previously supported wetlands.

Controversial aspects of the project or its effects

The Trustees do not expect any controversy to arise in connection with wetland enhancement with respect to the project approach. Wetland enhancement through phragmites control and circulation improvement has been implemented, by these and other Trustees in Delaware, with no adverse reaction from the public. Current governmental policy supports restoring wetlands along the middle Atlantic Coast. The Trustees anticipate that the citizens of Delaware would support either of these wetland restoration projects.

Uncertain effects or unknown risks

The Trustees do not believe there are uncertain effects or unknown risks to the environment associated with implementing the proposed restoration actions. The Trustees would conduct a thorough site survey and engineering analysis to address any significant uncertainties before implementing the proposed restoration actions.

Precedential effects of implementing the project

The Trustees have pursued wetland restoration projects to compensate for other natural resource damages claims in Delaware. Wetland restoration projects are regularly implemented along the Delaware coast to protect against erosion, control invasive species, and to preserve or restore coastal habitats, and such projects have

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used techniques to be used here. The proposed restoration actions, therefore, set no precedents for future actions of a type that would significantly affect the quality of the human environment.

Possible, significant cumulative impacts

Project effects will be cumulative in the sense that the creation of marsh and wet prairie will provide resource services into the future. The Trustees, however, know of no impacts to the environment to which the proposed restoration actions would contribute that, cumulatively, would constitute a significant impact on the quality of the human environment. All proposed projects would only restore a habitat type – low salinity marsh – that originally existed and naturally occurred in the area where the enhancement is proposed. Further, the actions proposed in this Draft DARP/EA are intended to restore habitat services to offset the natural resource loss of equivalent habitat services attributable to the Dupont Newport NPL Site. The restoration of these services is designed to make the public whole, i.e. compensation for injuries to natural resources. The proposed restoration actions also are not part of any systematic or comprehensive program or plan to address the conditions along the Delaware coast or in the Delaware Bay drainage area.

Effects on National Historic Sites or nationally significant cultural, scientific or historic resources

The Trustees, after consultation with the Delaware Department of State, Division of Historical and Cultural Affairs, and the State Historic Preservation Office, are aware of no previously recorded archeological sites located in the area of the proposed projects. Further, as a fairly remote aquatic environment, the topographical setting of the area has a low potential for resources of cultural or historic significance. The Trustees believe the proposed restoration actions will not affect any designated National Historic Site or any nationally significant cultural, scientific, or historic resources.

Effects on endangered or threatened species

The Trustees know of no direct or indirect impacts of the proposed restoration actions on threatened or endangered species, or their designated critical habitats. The general locale where the restoration actions would be sited is not critical habitat for any listed species.

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Violation of environmental protection laws

The proposed restoration actions do not require nor do the Trustees anticipate any violation of federal, state or local laws, designed to protect the environment incident to or as a consequence of the implementation of either of the proposed actions. The restoration actions proposed can be implemented in compliance with all applicable environmental laws.

6.2 PRELIMINARY CONCLUSION & FINDING OF NO SIGNIFICANT IMPACT ON THE QUALITY OF THE HUMAN ENVIRONMENT

Under 40 C.F.R. §§ 1501.5 and 1501.6 for the purposes of this NEPA analysis, NOAA is the lead agency and USFWS is a cooperating agency. Based on the analysis in this Section and the other information and analyses included throughout the Draft DARP/EA as part of the environmental review process for the proposed restoration actions, the federal Trustees conclude that the tidal circulation enhancements and shoreline stabilization at the Pike tract ("Proposed Restoration Alternatives") will not, if implemented, result in any significant impacts on the quality of the human environment. The proposed restoration projects would provide habitat beneficial to the biological environment found within the proposed project areas. The proposed restoration projects will not impact the cultural and human environment except for providing for increased opportunities for recreation and commercial fishing by improving estuary habitats for fish dependent and other aquatic organism dependent upon estuarine environments. Pending the public review and comment process, significant impacts are not expected from the Proposed Restoration Alternatives; thus, no environmental impact statement (EIS) is expected for either of the restoration actions outlined herein.

Pending the public review and comment process, a Finding of No Significant Impact (FONSI) based upon this Draft Environmental Assessment, would fulfill and conclude all requirements for compliance with NEPA by the federal Trustees.

6.3 ENDANGERED AND THREATENED SPECIES

The Endangered Species Act of 1973 instructs federal agencies to carry out programs for the conservation of endangered and threatened species and to conserve the ecosystems upon which these species depend. Numerous endangered and threatened species are seasonal or occasional visitors to the Christina and Mispillion River sections of the Delaware Bay estuarine ecosystem.

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Endangered and threatened species known to occur in the Christina and Mispillion River sections of the Delaware Bay estuarine ecosystem are listed in (Table 6-1: USFWS, 2005; Delaware Division of Fish & Wildlife, 2000). Contiguous forests and wetlands provide habitat for several Federal or State-listed endangered or threatened species:

- o Bog Turtle (*Clemmys muhlenbergii*)
- o Cerulean Warbler (*Dendroica cerulea*)
- o Long-tailed Salamander (*Eurycea longicauda*)
- o Bald Eagle (*haliaeetus leucocephalus*)

The ESA directs all federal agencies to conserve endangered and threatened species and their habitats to the extent their authority allows. Protection of wildlife and preservation of habitat are central objectives in this effort. Under the ESA, the Department of Commerce (through NOAA) and the Department of the Interior (through USFWS) publish lists of endangered and threatened species. Section 7 of the Act requires federal agencies to consult with these departments to minimize the effects of federal actions on these listed species. The restoration actions described in this Draft DARP/EA are not expected to adversely impact any threatened or endangered species. The actions would create or enhance habitats beneficial to supporting ecosystems for any such species. Informal consultation procedures have been initiated with the USFWS and with the National Marine Fisheries Service (NOAA Fisheries) in order to ensure the restoration action are implemented in accordance with applicable provisions of the ESA.

Table 6-1 - Federal Endangered or Threatened Species in Delaware

<u>Federal Status</u>	<u>Listing</u>
T	<i>Eagle, bald (lower 48 States) (Haliaeetus leucocephalus)</i>
T	<i>Plover, piping (except Great Lakes watershed) (Charadrius melanotos)</i>
E	<i>Puma (=cougar), eastern (Puma (=Felis) concolor couguar)</i>
T	<i>Sea turtle, green (except where endangered) (Chelonia mydas)</i>
E	<i>Sea turtle, hawksbill (Eretmochelys imbricata)</i>
E	<i>Sea turtle, Kemp's ridley (Lepidochelys kempii)</i>
E	<i>Sea turtle, leatherback (Dermochelys coriacea)</i>
T	<i>Sea turtle, loggerhead (Caretta caretta)</i>
E	<i>Squirrel, Delmarva Peninsula fox (Sciurus niger cinereus)</i>
E	<i>Sturgeon, shortnose (Acipenser brevirostrum)</i>

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<u>Federal Status</u>	<u>Listing</u>
T	Turtle, bog (=Muhlenberg) (northern) (<i>Clemmys muhlenbergii</i>)
E	Whale, finback (<i>Balaenoptera physalus</i>)
E	Whale, humpback (<i>Megaptera novaeangliae</i>)
E	Whale, right (<i>Balaena glacialis</i> (incl. <i>australis</i>))
<u>Plants</u>	
T	Amaranth, seabeach (<i>Amaranthus pumilus</i>)
T	Pink, swamp (<i>Helonias bullata</i>)
T	Pogonia, small whorled (<i>Isotria medeoloides</i>)
E	Dropwort, Canby's (<i>Oxypolis canbyi</i>)
T	Beaked-rush, Knieskern's (<i>Rhynchospora knieskernii</i>)
<u>State Status</u>	<u>Listing</u>
<u>Amphibians</u>	
E	Eastern Tiger Salamander (<i>Ambystoma tigrinum tigrinum</i>)
E	Barking Treefrog (<i>Hyla gratiosa</i>)
<u>Birds</u>	
E	Brown Creeper (<i>Certhia americana</i>)
E	Bald Eagle (<i>Haliaeetus leucocephalus</i>)
E	Pied-billed Grebe (<i>Podilymbus podiceps</i>)
E	Northern Harrier (<i>Circus cyaneus</i>)
E	Cooper's Hawk (<i>Accipiter cooperii</i>)
E	Black-Crowned Night-Heron (<i>Nycticorax nycticorax</i>)
E	Yellow-Crowned Night-Heron (<i>Nyctanassa violacea</i>)
E	Northern Parula (<i>Parula americana</i>)
E	Piping Plover (<i>Charadrius melanotos</i>)
E	Short-eared Owl (<i>Asio flammeus</i>)
E	American Oystercatcher (<i>Haematopus palliatus</i>)
E	Black Rail (<i>Laterallus jamaicensis</i>)
E	Upland Sandpiper (<i>Bartramia longicauda</i>)
E	Loggerhead Shrike (<i>Lanius ludovicianus</i>)
E	Black Skimmer (<i>Rynchops niger</i>)
E	Sparrow, Henslow's (<i>Ammodramus henslowii</i>)
E	Common Tern (<i>Sterna hirundo</i>)
E	Forster's Tern (<i>Sterna forsteri</i>)
E	Least Tern (<i>Sterna antillarum</i>)
E	Cerulean Warbler (<i>Dendroica cerulea</i>)
E	Hooded Warbler (<i>Wilsonia citrina</i>)
E	Swainson's Warbler (<i>Limnothlypis swainsonii</i>)
E	Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)
E	Sedge Wren (<i>Cistothorus platensis</i>)
<u>Fish</u>	
E	Atlantic Sturgeon (<i>Acipenser oxyrinchus</i>)
<u>Insects</u>	
E	Little White Tiger Beetle (<i>Cicindela lepida</i>)

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<u>Federal Status</u>	<u>Listing</u>
<i>E</i>	<i>White Tiger Beetle (Cicindela dorsalis)</i>
<i>E</i>	<i>Seth Forest Scavenger Beetle (Hydrochus spp.)</i>
<i>E</i>	<i>Frosted Elfin (Incisalia irus)</i>
<i>E</i>	<i>Bethany Firefly (Photuris bethaniensis)</i>
<i>E</i>	<i>Hessel's Hairstreak (Mitoura hesselii)</i>
<i>E</i>	<i>King's Hairstreak (Satyrium kingi)</i>
<i>E</i>	<i>Rare Skipper (Problema bulenta)</i>
<i>E</i>	<i>Mulberry Wing (Poanes massasoit chermocki)</i>
Mammals	
<i>E</i>	<i>Delmarva Fox Squirrel (Sciurus niger cinereus)</i>
Mollusks	
<i>E</i>	<i>Yellow Lampmussel (Lampsilis cariosa)</i>
<i>E</i>	<i>Eastern Lampmussel (Lampsilis radiata)</i>
<i>E</i>	<i>Dwarf Wedgemussel (Alasmidonta heterodon)</i>
<i>E</i>	<i>Eastern Pondmussel (Ligumia nasuta)</i>
<i>E</i>	<i>Brook Floater (Alasmidonta varicosa)</i>
<i>E</i>	<i>Tidewater Mucket (Leptodea ochracea)</i>
Reptiles	
<i>E</i>	<i>Leatherback Sea Turtle (Dermochelys coriacea)</i>
<i>E</i>	<i>Atlantic Ridley Sea Turtle (Lepidochelys kempii)</i>
<i>E</i>	<i>Green Sea Turtle (Chelonia mydas)</i>
<i>E</i>	<i>Loggerhead Sea Turtle (Caretta caretta)</i>
<i>E</i>	<i>Bog Turtle (Clemmys muhlenbergii)</i>
<i>E</i>	<i>Corn Snake (Elaphe guttata guttata)</i>

6.4 ESSENTIAL FISH HABITAT

Congress enacted amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265) in 1996 that established procedures for identifying Essential Fish Habitat (EFH) and required interagency coordination to further the conservation of Federally managed fisheries. Rules published by the NOAA Fisheries (50 C.F.R. §§ 600.805 - 600.930) specify that any Federal agency that authorizes, funds or undertakes, or proposes to authorize, fund, or undertake an activity which could adversely affect EFH is subject to the consultation provisions of the above-mentioned act and identifies consultation requirements. This section was prepared to meet these requirements.

The Mid-Atlantic Fishery Management Council has identified Essential Fish Habitat (EFH) for bluefish - *Pomatomus saltatrix*, summer flounder - *Paralichthys dentatus*, scup - *Stenotomus chrysops*, black sea bass - *Centropristes striata*, spiny dogfish - *Squalus acanthias*, tilefish - *Lopholatilus chamaeleonticeps*, surf clam - *Spisula*

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solidissima, ocean quahog - *Artica islandica*, long finned squid - *Loligo pealei*, short finned squid - *Illex illecebrosus*, Atlantic butterfish - *Peprius triacanthus*, and Atlantic mackerel - *Scomber scombrus*. It appears that the Pike Property Tract has not been designated as EFH for any of these species.

Effect on Essential Fish Habitat

The restoration project will affect approximately 60 acres of marsh habitat. Some benthos will recover relatively fast, but the benthic assemblage in bottom sediments may permanently change. There will be an initial loss of estuarine water column and estuarine mud bottoms. While they are being filled, the area within them will not be available for aquatic organism use. It will take some time before the marsh is established; however, the estuarine nature of the new marsh, once established, will provide habitat for numerous species, which utilize estuaries during different life stages. The designed features, which will allow circulation of waters through the marsh, make this a potentially exceptionally productive estuarine area. While there will be impacts to the benthos, some of which will be irreversible, there will be an overall gain in the ecology of the Mispillion River system from the creation of the restoration features. This project is expected to provide improved habitats, which are likely to increase fisheries populations within the project area.

Effects on the Managed Species, and Associated Species by Life History Stage.

No managed species are expected to be affected therefore, no mitigation is required.

The Federal Agency's Views Regarding The Effects Of The Action On EFH

It is the opinion of the federal trustees that the project as proposed will not have a significant adverse effect upon EFH. While there will be some loss of bottom area, the beneficial use plans will have an overall effect of benefiting the managed species and should provide an overall increase in marsh habitats.

Conclusion of Effects on EFH

Though initial, significant impacts on habitat (although not designated as EFH) are expected due to loss of estuarine water column and mud bottoms, there will be a net benefit to the ecology of the Mispillion River system from the creation of the restoration features. Because this project is expected to provide habitats, which are likely to increase fisheries populations within the project area, no mitigation is necessary.

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The Trustees have initially determined that the proposed restoration actions will have no adverse effect on any EFH designated or pending designation under the Act. NOAA Fisheries is being consulted regarding this determination.

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7.0 COMPLIANCE WITH OTHER KEY STATUTES, REGULATIONS AND POLICIES

7.1 CLEAN WATER ACT (CWA), 33 U.S.C. § 1251 ET SEQ.

The CWA is the principal law governing pollution control and water quality of the nation's waterways. Section 404 of the law authorizes a permit program for the beneficial uses of dredged or fill material. The Army Corps of Engineers (USACE) administers the program. In general, restoration projects, which move significant amounts of material into or out of waters or wetlands, for example, hydrologic restoration of marshes, require 404 permits. A CWA 404 permit will be obtained, if required, in order to implement any restoration action selected in this Draft DARP/EA.

7.2 RIVERS AND HARBORS ACT, 33 U.S.C. § 401 ET SEQ.

The Rivers and Harbors Act regulates development and use of the nation's navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters and vests the Corps with authority to regulate discharges of fill and other materials into such waters. Restoration actions that must comply with the substantive requirements of Section 404 must also comply with the substantive requirements of Section 10. Any such permit would be obtained, as required, in order to implement any restoration action selected in this Draft DARP/EA.

7.3 COASTAL ZONE MANAGEMENT ACT (CZMA), 16 U.S.C. § 1451 ET SEQ., 15 C.F.R. PART 923

The goal of the CZMA is to encourage states to preserve, protect, develop, and, where possible, restore and enhance the nation's coastal resources. Under Section 1456 of the CZMA, restoration actions undertaken or authorized by federal agencies within a state's coastal zone are required to comply, to the maximum extent practicable, with the enforceable policies of a state's federally approved Coastal Zone Management Program. NOAA and the USFWS found the restoration actions identified in this Draft DARP/EA to be consistent with the Delaware Coastal Zone Management Program, and a determination of consistency will be submitted to the appropriate state agencies for review in parallel to the release of the Draft DARP/EA.

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7.4 FISH AND WILDLIFE CONSERVATION ACT, 16 U.S.C. § 2901 ET SEQ.

The restoration actions described herein will encourage the conservation of non-game fish and wildlife.

7.5 FISH AND WILDLIFE COORDINATION ACT (FWCA), 16 U.S.C. § 661 ET SEQ.

The FWCA requires that federal agencies consult with USFWS, NOAA Fisheries, and state wildlife agencies regarding activities that affect, control, or modify waters of any stream or bodies of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and habitat utilizing these aquatic environments. Coordination is taking place by and between NOAA Fisheries, the USFWS and DNREC, the appropriate state wildlife agency. This coordination is also incorporated into compliance processes used to address the requirements of other applicable statutes, such as Section 404 of the CWA. The restoration actions described herein will have a positive effect on fish and wildlife resources.

7.6 MARINE MAMMAL PROTECTION ACT, 16 U.S.C. § 1361 ET SEQ.

The Marine Mammal Protection Act provides for the long-term management of and research programs for marine mammals. It places a moratorium on the taking and importing of marine mammals and marine mammal products, with limited exceptions. The Department of Commerce is responsible for whales, porpoise, seals, and sea lions. The Department of the Interior is responsible for all other marine mammals. The restoration actions described in this Draft DARP/EA will not result in any adverse effect to marine mammals.

7.7 MIGRATORY BIRD CONSERVATION ACT, 16 U.S.C. § 715 ET SEQ.

The proposed restoration action will have no adverse effect on migratory birds that are likely to benefit from the establishment of new marsh habitat.

7.8 NATIONAL HISTORIC PRESERVATION ACT, 16 U.S.C. § 470 ET SEQ.

The Trustees know of no known cultural or historic resources within or in the vicinity of the proposed restoration sites.

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7.9 INFORMATION QUALITY GUIDELINES ISSUED PURSUANT TO PUBLIC LAW 106-554

Information disseminated by federal agencies to the public after October 1, 2002, is subject to information quality guidelines developed by each agency pursuant to Section 515 of Public Law 106-554 that are intended to ensure and maximize the quality of such information (i.e., the objectivity, utility and integrity of such information). The Draft DARP/EA, upon release as a draft, was identified as an information product covered by information quality guidelines established by NOAA and DOI for this purpose. The information contained herein complies with applicable guidelines.

7.10 EXECUTIVE ORDER 12898 (59 FED. REG. 7629) - ENVIRONMENTAL JUSTICE

This Executive Order requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. EPA and the Council on Environmental Quality (CEQ) have emphasized the importance of incorporating environmental justice review in the analyses conducted by federal agencies under NEPA and of developing mitigation measures that avoid disproportionate environmental effects on minority and low-income populations. The Trustees have concluded that no low income or ethnic minority communities would be adversely affected by the restoration projects identified herein.

7.11 EXECUTIVE ORDER NUMBER 11514 (35 FED. REG. 4247) - PROTECTION AND ENHANCEMENT OF ENVIRONMENTAL QUALITY

A Draft Environmental Assessment is integrated within this Draft DARP/EA. Environmental analyses and coordination have taken place as required by NEPA.

7.12 EXECUTIVE ORDER NUMBER 11990 (42 FED. REG. 26,961) - PROTECTION OF WETLANDS

The selected restoration actions will not result in adverse effects on wetlands or the services they provide, but rather will provide for the enhancement and protection of wetlands and wetland services.

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7.13 EXECUTIVE ORDER NUMBER 12962 (60 FED. REG. 30,769) - RECREATIONAL FISHERIES

The selected restoration actions will not result in adverse effects on recreational fisheries but will help ensure the enhancement and protection of such fisheries.

DRAFT FINAL**8.0 LITERATURE CITED**

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9.0 LIST OF PERSONS/AGENCIES CONSULTED

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Carl Alderson

Delaware Department of Natural Resources and Environmental Control

Jane Biggs Sanger
Robert Hossler
Phil Carpenter
Karrisa Hendershot

Fish and Wildlife Service, United States Department of the Interior

Sherry Krest
Al Rizzo

DRAFT FINAL

10.0 LIST OF PREPARERS

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ATTACHMENT B
MAP OF ASSESSMENT AREA

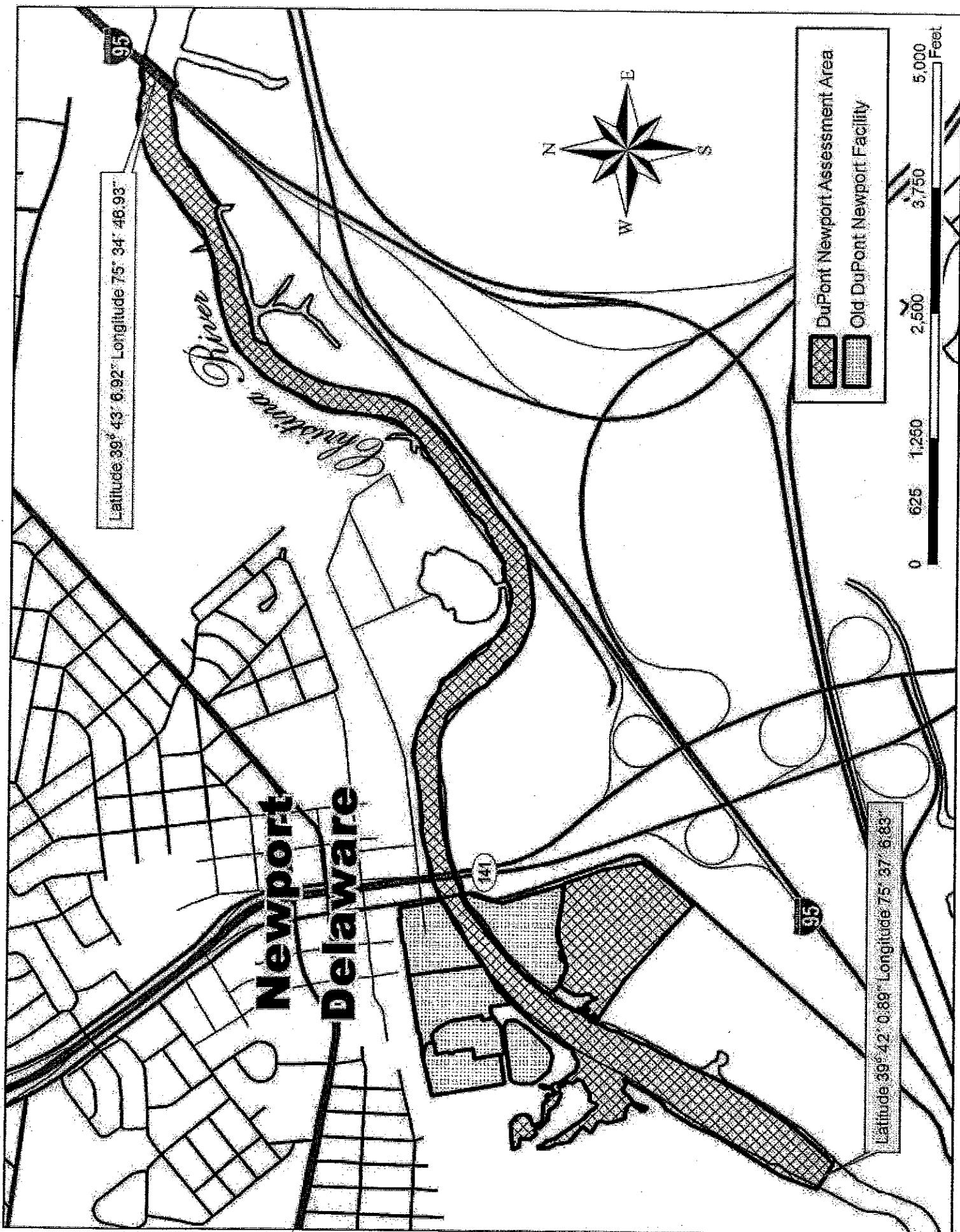
United States of America and the State of Delaware

v.

**E. I. du Pont de Nemours and Company &
Ciba Specialty Chemicals Corporation**

Consent Decree

2006



ATTACHMENT C
AGREEMENT AMONG TRUSTEES

United States of America and the State of Delaware

v.

**E. I. du Pont de Nemours and Company &
Ciba Specialty Chemicals Corporation**

Consent Decree

2006



United States Department of the Interior



FISH AND WILDLIFE SERVICE

300 Westgate Center Drive
Hadley, MA 01035-9589

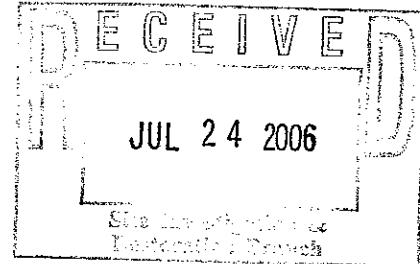
In Reply Refer To:
FWS/Region 5/ES-EC

Working Documents
Jane Biggs Sanger
Only

JUL 20 2006

Ms. Jane Biggs Sanger
Delaware Department of Natural Resources
and Environmental Control
391 Lukens Drive
New Castle, Delaware 19720

Mr. Ron Gouquet
National Oceanic and Atmospheric Administration
Coastal Protection and Restoration Division
7600 Sand Point Way
Seattle, Washington 98115-6349



Dear Ms. Biggs Sanger and Mr. Gouquet:

Per a Trustee conference call on November 22, 2005, attended by Sherry Krest of the Department of the Interior's (DOI) U.S. Fish and Wildlife Service (Service), Jane Biggs Sanger of the Delaware Department of Natural Resources and Environmental Control (DNREC), and Ron Gouquet of the National Oceanic and Atmospheric Administration (NOAA), the Trustees agreed to procedures for implementing a restoration project from funds received as a result of a settlement with E.I. Du Pont de Nemours and Company of natural resource damages liability arising from releases of hazardous substances from the Du Pont Newport Superfund Site (Site). These procedures are outlined in this letter and affirmed by the duly authorized concurrences below.

Background. Pursuant to the Consent Decree entered into between the United States, the State of Delaware, E.I. DuPont de Nemours and Company, and Ciba Specialty Chemicals Corporation, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9607(a), (f), and the Hazardous Substance Cleanup Act (HSCA), the Trustees received sums to restore natural resources and natural resource services injured as a result of releases of hazardous substances from the Site. These monies have been placed in a segregated account in DOI's Natural Resource Damage Assessment and Restoration (NRDAR) Fund (Restoration Fund) and will be managed and invested by the DOI in accordance with law on behalf of the Trustees. The settlement is embodied in the Consent Decree and attachments, including the Damage Assessment and Restoration Plan (DARP).

Ms. Jane Biggs Sanger and Mr. Ron Gouguet

2

Restoration Project Description. The restoration project identified in the Consent Decree and DARP entails shoreline stabilization, vegetative planting and management, and improvements to fish and tidal exchange on private property along the Mispillion River. The restoration project will be protected in perpetuity through an environmental covenant.

Trustee Council. The Trustees have made technical, administrative, and management decisions as a Trustee Council. The Trustees resolve to continue to operate in this manner and appoint the following to the Trustee Council for the restoration implementation phase:

- Sherry Krest for DOI;
- Jane Biggs for DNREC; Rob Hossler (jointly and/or alternatively);
- Ron Gouguet for NOAA.

The Trustee Council will ensure proper expenditure of restoration funding, including accounting for such expenditures, authorize such expenditures by unanimous decision, and oversee implementation of restoration projects. In addition, the Trustee Council will approve updates or revisions to the restoration budget, make formal requests for releases of recovered restoration funds from the DOI Restoration Fund, allocate contingency funds as necessary, and approve certification of completion for each restoration project. The Trustee Council shall elevate disputes to their respective senior management for resolution.

DOI Implementation. The Service will manage the restoration project and agrees to undertake the following:

- Develop a Statement of Work and a Work Plan specifying the design and construction requirements for the restoration project including a detailed budget and schedule for implementation;
- execute contracts, as necessary, to implement the restoration project;
- provide effective oversight of restoration implementation;
- provide Trustees with an accounting of funds received pursuant to the Consent Decree for restoration implementation and monitoring;
- ensure that any necessary Federal, State, and local permits are obtained for each restoration project;
- recommend to the Trustee Council use of contingency monies;
- maintain a record of restoration implementation decisions and actions, including any modifications to the restoration plan;
- provide progress updates to the Trustees regarding the status of restoration implementation and a final report;
- oversee monitoring of restoration project success and provide the Trustee Council with a report after each monitoring event.

Al Rizzo will be the project manager. However, the Service may designate a new project manager by providing written notice to the Trustees at least 2 weeks before the designation is effective.

Ms. Jane Biggs Sanger and Mr. Ron Gouget

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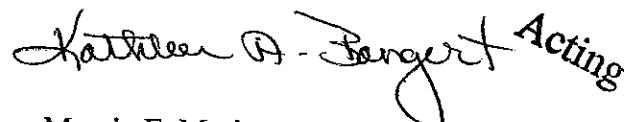
Interest and Accounting. Accrued interest will be retained in the Restoration Fund and will be used pursuant to requirements in the Consent Decree. The Service will ensure that costs incurred are documented using generally accepted accounting principles. Cost documentation will include, but not be limited to, the following:

- Labor costs of each employees;
- travel and transportation costs, including invoices and receipts;
- printing and reproduction costs, including invoices and receipts;
- contracts, including invoices and receipts for each billing period;
- supplies and materials, including invoices and receipts; and,
- overhead including method of calculation.

In addition, the Service agrees to provide cost documentation to the Trustee Council whenever such documentation is due to Du Pont pursuant to the Consent Decree.

If you have any questions or need further assistance, please contact Michael G. Thabault, Assistant Regional Director, Ecological Services, at 413-253-8304, or Robin Heubel, Regional NRDAR Coordinator, at 413-253-8630.

Sincerely,



Marvin E. Moriarty
Regional Director/Authorized Official
United States Department of the Interior
U.S. Fish and Wildlife Service

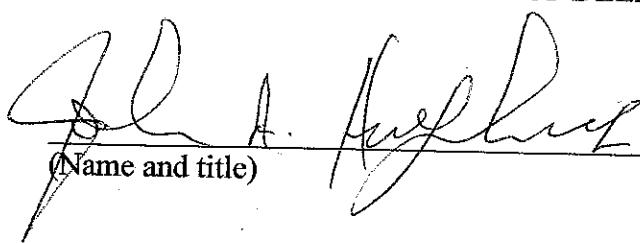
cc: Tom Brosnan, East Coast Regional Coordinator, NOAA
Rachel Jacobson, Esquire, Department of Justice
Katherine Pease, Esquire, NOAA
Mark Barash, Esquire, Office of the Solicitor, DOI
Robert S. Kuehl, Esquire, Deputy Attorney General, State of Delaware
Sherry Krest, U.S. Fish and Wildlife Service, Chesapeake Bay Field Office

CONCURRENCE OF THE NATIONAL OCEANIC AND ATMOSPHERIC
ADMINISTRATION

(Name and title)

DATE

CONCURRENCE OF THE STATE OF DELAWARE


(Name and title)

8-28-06
DATE

ATTACHMENT D
MONITORING PLAN

United States of America and the State of Delaware

v.

**E. I. du Pont de Nemours and Company &
Ciba Specialty Chemicals Corporation**

Consent Decree

2006



September 27, 2005

Monitoring & Maintenance Plan Summary
DuPont Newport – DARP
Pike Property Conservation
Milford, Kent & Sussex County, Delaware

This Monitoring and Maintenance Plan Summary provides a preliminary conceptual description of the proposed post construction monitoring and maintenance activities anticipated for the DuPont Newport Damage Assessment and Restoration Plan (DARP) - Pike Property Conservation (Project). This summary will be replaced with a detailed monitoring and maintenance plan that will be finalized to guide post construction field inspections. This summary is based on performance standards cooperatively developed by the project Trustees, including the United States Fish and Wildlife Service (USFWS) on behalf of the U.S Department of the Interior, National Oceanic and Atmospheric Administration (NOAA), Delaware Department of Natural Resources and Environmental Control (DNREC) and DuPont. These performance standards identify four categories of project success metrics including:

- Restoration Stability;
- Biological;
- Wetland Hydrology; and
- Ecological Functions.

Restoration stability will focus on bank stability along the Mispillion River and the tidal channels and pools within the oxbow marsh. Stability of the site access road will also be assessed. The biological focus is on both plant community and fish habitat. The development of the plant community along the Mispillion River bank and the overall vegetative cover within the oxbow marsh will be documented as will the fish use of created low tide channel and pool habitats. Wetland hydrology will center on the qualitative comparison of documented water chemistry within the river, oxbow channel, and oxbow marsh channels and pools. Finally, the assessment of ecological functions will focus on those areas of the property enhanced through the project construction efforts, particularly the Mispillion River bank and the oxbow marsh area.

Recurrent monitoring will be conducted to assess progress toward the performance standards during the first five years following construction. The monitoring will use two levels of effort (Routine and Annual) and a phased approach wherein initial monthly inspections will be gradually scaled back to biannual inspections as the restoration becomes increasingly established.

Routine inspections will be conducted throughout the year, starting within the first week following completion of restoration construction. These inspection efforts will be designed to qualitatively document progress toward performance standards and identify corrective measures that may be needed.

DuPont Newport – DARP
 Monitoring and Maintenance Summary
 September 27, 2005
 Page -2-

The annual inspection will include routine inspection efforts and a quantitative assessment of the plant community composition. Annual inspections will be conducted toward the end of the growing season (August/September) starting with the first full growing season following restoration construction. Assessment of the wetland functions during the 1st and 5th year will be based on the Evaluation for Planned Wetlands (EPW) methods and will provide additional support and quantification for routine and annual inspection findings. Reporting activities will accompany each inspection effort.

A list of efforts associated with the routine and annual inspections and reporting needs are provided below along with potential corrective action issues. Routine and annual monitoring efforts are also provided on the attached table (Table 1).

MONITORING

Routine Inspections:

Restoration Stability Variables and Monitoring Frequencies –

- Observe and document the condition of installed construction material (i.e., coir logs, erosion control matting, large woody debris (LWD)) and evidence of erosion along restoration portions of the river bank;
- Observe and document the condition of installed access road culverts and any evidence of erosion along the reconstructed portion of the roadway.
- Note any immediate need for corrective action;
- Coir logs and other materials will degrade over time. Stability sufficient for the revegetation of $\geq 70\%$ of area and/or establishment of stable tidal flat will not require replacement of degraded material.
- Photographic documentation at specific locations;
- Monthly for six months following construction;
- Bimonthly thereafter for 1st year;
- Immediately following severe storms that have the potential to cause substantial damage (e.g., 10yr storm event w/sustained winds >30kts);
- Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and
- Biannually in the 3rd, 4th, and 5th year (Beginning/end of growing season (May/June & Aug/Sept)).

Tidal Channels/Pools Function and Monitoring Frequencies –

- Document tidal exchange within created oxbow marsh channels and pools through observation of tidal inundation and/or discharge;
- Identify conditions that may substantially impact tidal exchange and which may require corrective action (ex., channel blockage);
- Document general changes in created channel morphology as the system adjusts to site dynamics including observations of sedimentation, scour, channel realignment/meander, etc.;

DuPont Newport – DARP
 Monitoring and Maintenance Summary
 September 27, 2005
 Page -3-

- Created channels will morphologically adjust and accumulate sediment naturally over time. Maintenance of "as built" channels is not required to meet desired tidal exchange functions.
- Photographic documentation at specific locations;
- Bimonthly for 1st year following construction;
- Immediately following severe storms that have the potential to cause substantial damage;
- Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and
- Biannually in the 3rd, 4th, and 5th year (Beginning/end of growing season (May/June & Aug/Sept)).

Plant Community Variables and Monitoring Frequencies –

- Document observations of development and stability of planted vegetation and natural recruitment along Mispillion River bank and other planted areas;
- Note need for corrective action resulting from forage, stress or erosion, if any;
- Photographic documentation at specific locations;
- Identify general areas of *Phragmites australis* and its condition (size and location of stand/health);
- Monthly for up to six months within the first growing season (i.e., April to September) following construction;
- Immediately following severe storms that have the potential to cause substantial damage (e.g., 10yr storm event w/sustained winds >30kts);
- Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and
- Biannually in the 3rd, 4th, and 5th year (Beginning/end of growing season (May/June & Aug/Sept)).

Fish Habitat Variables and Monitoring Frequencies –

- Observe and document fish use of created tidal channels and pools during low tide;
- Document conditions that may substantially impact fish habitat and which may require corrective action (ex., channel blockage);
- Created channels will morphologically adjust and accumulate sediment naturally over time. Maintenance of "as built" channels is not required to meet desired fish habitat functions.
- Bimonthly within 1st year growing season following construction;
- Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and
- Biannually in the 3rd, 4th, and 5th year (Beginning/end of growing season (May/June & Aug/Sept)).

Water Chemistry Variables and Monitoring Frequencies –

- Document in-situ field measurements of dissolved oxygen (subsequently converted to percent saturation), salinity, temperature, and conductivity using Horiba U10 or similar water quality meter;
- Data to be collected in Mispillion River, oxbow channel, created oxbow marsh channels (2-main channel locations), and within created marsh pools;
- Bimonthly for 1st year following construction; and

DuPont Newport – DARP
 Monitoring and Maintenance Summary
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- Biannually in the 2nd and 5th year (Beginning/end of growing season (May/June & Aug/Sept)).

Annual Inspections:

All routine inspection activities plus:

Plant Community Variables and Monitoring Frequencies –

- Quantitative assessment of plant community including percent cover, dominance and species richness;
- Community assessment conducted using either fixed transects and/or quadrats;
- River bank and oxbow marsh communities assessed separately;
- Identify specific areas of *Phragmites australis* and its condition (size and location of stand/percent cover/health);
- Conduct toward end of growing season (Aug/Sept); and
- Annually during the 1st, 2nd, and 5th years following construction.

Wetland Functions Evaluation and Monitoring Frequencies –

- Quantitative assessment of wetland functions and values using the Evaluation of Planned Wetlands (EPW) methodology;
- Time interval comparison of functional capacity indices and units (FCIs and FCUs) for area prior to construction (wetland assessment area (WAA)), and for conditions documented within the restored “planned wetland”;
- Time interval values also compared to established goals for the planned wetlands, which will be developed prior to construction; and
- At the end of the 1st and 5th year growing season following construction.

CORRECTIVE MEASURES

Conditions that may jeopardize successful restoration will be evaluated to determine the need for corrective measures. Corrective measures may be implemented to address bank stability, erosion, channel failure, replanting needs, or invasive species control. Minor corrective measures [i.e., activity requiring minor funding and effort (ex., <\$2,000 for removal of small quantity of woody debris blocking tidal channel)] will be implemented as required and as guided by the routine and annual inspections. Major corrective measures, if any, will be submitted in writing to the Trustees for review and implemented following a two-week comment review period. Corrective measures will not be required for disturbances caused by force majeure type catastrophic events such as hurricanes or severe ice flows that may substantially impact restoration efforts at the project site.

REPORTING

Inspection forms will be developed. These forms and routine inspection summaries of activities and corrective measures, if any, will be submitted within 10 days of the routine inspection to the Trustees. Annual inspection reports will summarize the routine inspections, provide the results

DuPont Newport – DARP
Monitoring and Maintenance Summary
September 27, 2005
Page -5-

of the annual inspection plant community and invasive species surveys, and provide photographic documentation of site conditions. A discussion section will provide a qualitative assessment of the progress toward restoration success and current status of the performance standards. Maintenance and/or monitoring needs will be discussed, as will changes to the subsequent year monitoring scope of work, if any. The annual reports, including the final fifth year report, will be submitted within 90 days following the completion of the annual field inspection efforts.

TABLE 1
Routine and Annual Inspections
Pike Property - Conservation Site
Milford, Delaware

Type	Performance Standard	Metric	Corrective Measure	Monitoring Schedule
1 Restoration Stability	<p>i. Bank Stability - Structural stability of material (i.e., coir logs, matting, large woody debris (LWD)) or bank</p> <p>That erosion does not disrupt the functioning of the tidal channels/pools,</p> <p>iii. Access Road Stability - Structural stability of culvert and reconstructed access.</p>	<p>Stability with minimal erosion sufficient for the establishment/development of vegetation of $\geq 70\%$ of area and/or establishment of stable tidal flat,</p> <p>Tidal exchange within the majority of the Oxbow marsh created channels and pools</p>	<p>Document, Restore or Stabilize</p> <p>Document</p>	<p>Years 1 through 5</p> <p>1. Monthly for six months following construction, Bimonthly thereafter for 1st year;</p> <p>2. Immediately following severe storm events in 1st and 2nd years (e.g., 10yr storm with sustained winds $>10\text{kt/s}$);</p> <p>3. Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and</p> <p>4. Biannually in 3rd, 4th, and 5th year (beginning/end of growing season (May/June & Aug/Sept)).</p> <p>1. Monthly for six months following construction, Bimonthly thereafter for 1st year;</p> <p>2. Immediately following severe storm events in 1st and 2nd years;</p> <p>3. Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and</p> <p>4. Biannually in 3rd, 4th, and 5th year (beginning/end of growing season (May/June & Aug/Sept)).</p>
2 Biological	<p>i. Plant Community - General condition/stability and areal coverage of preferred planted or recruited vegetative species and/or community type (bank/marsh),</p> <p>General observations of <i>Phragmites australis</i> presence and condition</p> <p>ii. Fish Habitat - Documented use of created habitat within Oxbow marsh channels & pools</p>	<p>$\geq 70\%$ vegetative cover,</p> <p>Annual herbicide treatment as necessary</p>	<p>Replant as necessary to supplement natural recruitment;</p> <p>Document</p>	<p>Years 1 through 5</p> <p>1. Monthly for up to six months within the first growing season following construction, Bimonthly thereafter within the growing season for 1st year - Document vegetative establishment during growing season;</p> <p>2. Immediately following severe storm events in 1st and 2nd years;</p> <p>3. Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and</p> <p>4. Biannually in 3rd, 4th, and 5th year (beginning/end of growing season (May/June & Aug/Sept)).</p> <p>1. Bimonthly for 1st year following construction;</p> <p>2. Quarterly in 2nd year (March/April, May/June, Aug/Sept, Oct/Nov); and</p> <p>3. Biannually in 3rd, 4th, and 5th year (beginning/end of growing season (May/June & Aug/Sept)).</p>
3 Wetland Hydrology	Water Chemistry - Documented in-situ water chemistry w/in Oxbow marsh pools & channels, Oxbow channel, & Mispillion River	Presence of forage fish within created channels and pools,	Document	<p>Years 1 through 5</p> <p>1. Bimonthly for 1st year following construction; and</p> <p>2. Biannually in 2nd and 5th years (beginning/end of growing season (May/June & Aug/Sept)).</p>
4 Ecological Functions	Functions Evaluation (EPW assessment)	Document current conditions	NA - Present in 1st and 5th year Annual Reports	<p>Years 1 and 5</p> <p>1. 1st full growing season following construction; and</p> <p>2. 5th year growing season.</p>

Notes

1. See accompanying text for monitoring activities descriptions

1.1. Coir logs and other materials will degrade over time. Stability sufficient for the revegetation of $\geq 70\%$ of area and/or establishment of stable tidal flat will not require replacement of degraded material.

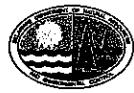
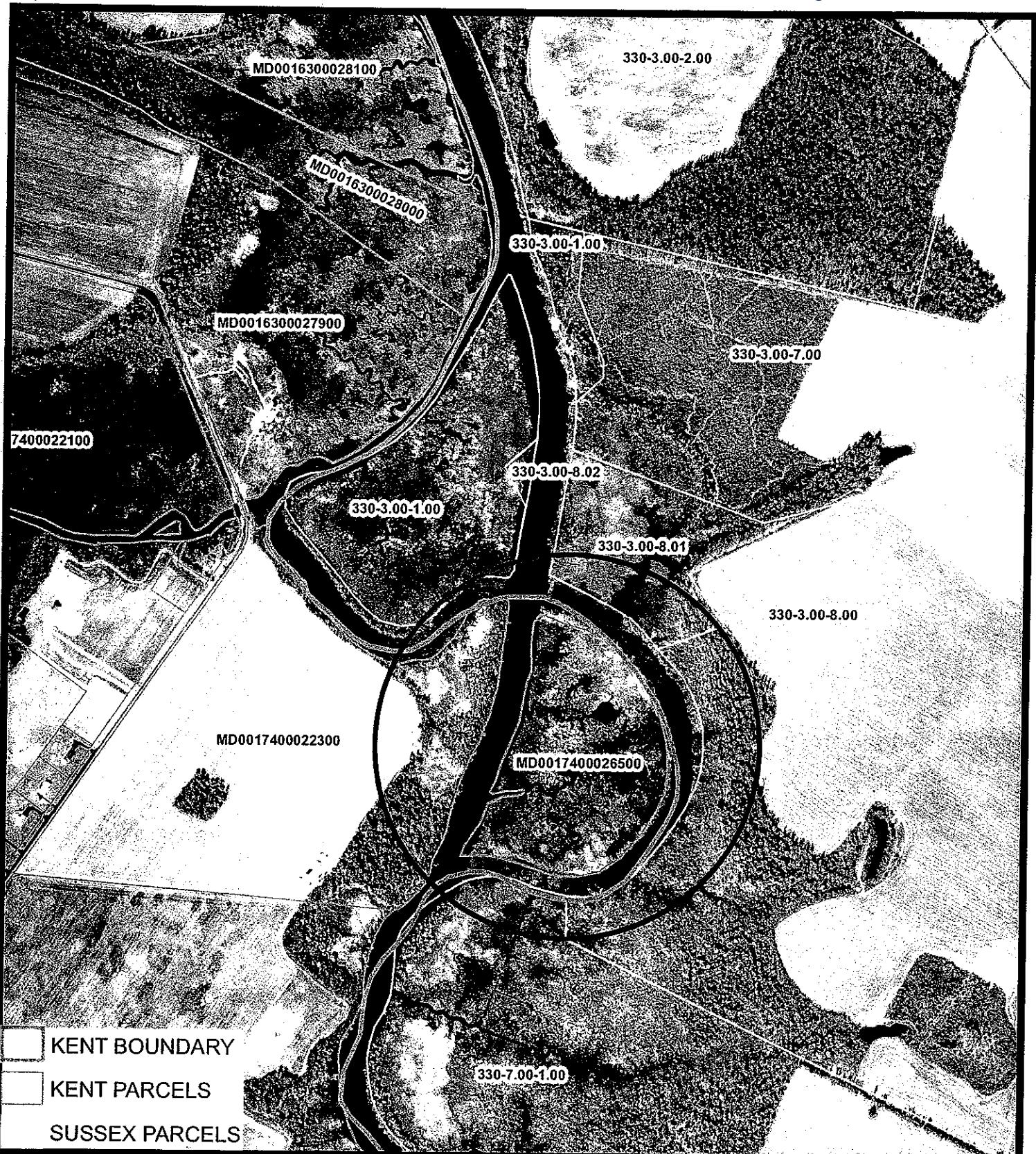
1.1.1. Created channels will morphologically adjust and accumulate sediment naturally over time. Maintenance of "as built" channels is not required to meet desired fish habitat and tidal exchange functions.

1.1.2. Preferred vegetative species¹ includes all marsh species typically found in mesohaline and oligohaline tidal marsh complexes with the exception of *Phragmites australis*, presence of which is acceptable as minimal coverage within the dominant preferred community.

2.ii. Observation of use of channels and pools by forage fish during low tide.

3. Water chemistry includes the collection of dissolved oxygen, temperature, salinity, and conductivity for qualitative comparison between project areas.

4. Functional Capacity Indices (FCI) and Functional Capacity Units (FCU) scores for functions documented using the Evaluation for Planned Wetlands methodology compared with 2004 baseline data from the site prior to restoration (the wetland assessment area (WAA)) and established goals for the planned wetland.



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1 Miles 1:8,000

**PIKE PROPERTY,
KENT COUNTY DELAWARE
TAX PARCEL #:
MD0017400026500; 21.7ac**

ATTACHMENT E
CONSERVATION EASEMENT

United States of America and the State of Delaware

v.

**E. I. du Pont de Nemours and Company &
Ciba Specialty Chemicals Corporation**

Consent Decree

2006

68354

#03250 #280

Kent County Tax Parcel No: 5-00-17400-02-6500-00001
 Sussex County Tax Parcel Nos.: 3-30 3.00 8.01 and
 3-30 3.00 8.02

Prepared by: The Delaware Department of Natural
 Resources and Environmental Control

Return to: Kathy Stiller-Banning, Program
 DNREC-SIRB
 391 Lukens Drive
 New Castle, Delaware 19720

ENVIRONMENTAL COVENANT

THIS GRANT OF AN ENVIRONMENTAL COVENANT is made this 19th day of December, 2005 (Environmental Covenant), by and between William R. Pike, Jr., a.k.a. William Robert Pike, Jr. and Sharon L. Pike, a.k.a. Sharon Lee Pike (husband and wife), Party of the First Part, hereinafter referred to as "Grantor," and the STATE OF DELAWARE, acting by and through the Department of Natural Resources and Environmental Control, hereinafter referred to as "Holder." This Environmental Covenant is executed pursuant to Title 7, Del. Code Chapter 79 Subtitle II and runs with the land.

WITNESSETH:

WHEREAS, this Environmental Covenant is being executed as part of ongoing Consent Decree negotiations between the E.I. DUPONT DE NEMOURS AND COMPANY ("DuPont") and the State of Delaware, the National Oceanic and Atmospheric Administration, Department of the Interior (hereinafter referred to as the "Trustees") to resolve natural resource obligations arising from the Newport Superfund site in Newport, Delaware; and

WHEREAS, the Consent Decree between the Trustees and DuPont will require DuPont to have executed an agreement on a property that will provide natural resource services similar to those injured at the DuPont Site (Newport Landfill); and

WHEREAS, DuPont has executed an agreement with Grantor to protect and conserve certain portions of Grantor's property described in Exhibit "A" attached hereto and made a part hereof (hereinafter "Property"); and

WHEREAS, certain watercourse remediation work needs to be completed to restore the natural tidal water flows at the Property (hereinafter "Work"); and

WHEREAS, DuPont, as part of its settlement obligations with Trustee, is willing to pay for the Work; and

WHEREAS, a title search of the Property has revealed no mortgages; and

December 13, 2005

Consideration:	\$0.00	Exempt Code: A
County	State	Total
0.00	0.00	0.00
counter	Date: 12/28/2005	

13pm

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WHEREAS, said Property possesses fish and wildlife and other natural resource values, scenic open space, cultural, and aesthetic values ("Conservation Values"), including any additional Conservation Values resulting from natural resource restoration, worthy of conservation protection and of great importance to the State; and

WHEREAS, in particular, the Property contains a wooded buffer zone on the original Misillion River and a manmade section of the river providing excellent fish and wildlife habitat on the Misillion River; and

WHEREAS, preservation of the Property as open space is pursuant to clearly delineated state and local government conservation policies and will yield a significant public benefit; and

WHEREAS, the specific Conservation Values of the Property are documented in an inventory ("Baseline Documentation") as of the date hereof, containing reports, maps, photographs and other documentation of relevant features of the Property on file with the State of Delaware and incorporated by this reference, which the Delaware Department of Natural Resources and Environmental Control asserts is an accurate representation and condition of the Property at the time of this Environmental Covenant and is intended to serve as an objective information baseline for monitoring compliance with the terms of this Environmental Covenant agreement; and

WHEREAS, Grantor and Holder are desirous of preserving the natural state of the Property and further desire to conserve and protect the Property from disruption and/or other occurrences which might interfere with its ability to provide fish and wildlife habitat as well as other natural resource values; and

WHEREAS, Grantor and Holder are desirous of enhancing a riparian buffer zone to protect the fish and wildlife habitat from agricultural or other runoff; and

WHEREAS, Grantor hereby, as owner of the Property, wishes to grant and convey unto Holder the right to preserve and protect the Conservation Values of said Property in perpetuity; and

WHEREAS, Holder is a department of the State government among whose purposes is the preservation, protection or enhancement of land and water areas, natural, scenic, open, agricultural, cultural, and forested resource values; and

WHEREAS, Holder agrees by accepting this grant to honor the intentions of Grantor stated herein and to preserve and to protect in perpetuity the Conservation Values of the Property for the benefit of this generation and generations to come:

NOW, THEREFORE, in consideration of the above and the mutual covenants, terms, conditions, and restrictions contained herein, and pursuant to the laws of Delaware and in particular 7 Del. C. Chapter 79 Subtitle II, Grantor hereby voluntarily grants and conveys to

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Holder a Environmental Covenant in perpetuity over all of the Property, of the nature and character and to the extent hereinafter set forth.

1. PURPOSE

It is the purpose of this Environmental Covenant to (1) assure that the Property will be retained forever in its natural, scenic, open space, and forested condition, and to prevent any use of the Property that will significantly impair or interfere with the Conservation Values of the Property and (2) to enhance the riparian buffer zone to protect the fish and wildlife habitat.

2. RESTRICTIONS ON USE

Any activity on or use of the Property inconsistent with the purpose of the Environmental Covenant is prohibited. Without limiting the generality of the foregoing, the following activities and uses are expressly prohibited within the Property, subject to the express terms and conditions below:

- (A) No signs, billboards or outdoor advertising structures shall be placed or maintained on the Property; except for a reasonable number of signs for resource protection, safety, boundary identification, management, interpretation of natural, cultural, and historic areas, identification of occupant and for such other purposes as may be permitted with the prior written approval of Holder.
- (B) Except as provided for in 3. (B & C), no additional improvements, including, but not limited to, buildings, tennis courts, swimming pools, asphalt or concrete pavement, communications tower or antenna, utility line or conduit, parking lot or any other temporary or permanent structure or facility, shall be constructed, on, under or above the Property.
- (C) No dumping, depositing, abandoning, discharging or releasing of any gaseous, liquid, solid or hazardous wastes, substances, materials or debris of whatever nature on, in, over, or under the ground or into surface or ground water of the Property shall occur; except as permitted by law.
- (D) There shall be no depositing, excavation or removal of loam, peat, gravel, soil, rock, sand, or similar material, nor any change in the general topography of the land within the Property, except for Grantor and Holder approved material associated with designated trails and as detailed in the approved Work and for fire management, or management of the riparian zone or wetland, with prior written approval of Grantor and Holder.
- (E) There shall be no removal or destruction of plants, trees, shrubs, wildflowers or other vegetation living or dead, or animal species except for control of diseases, pests, non-native species, and noxious weeds; for safety purposes; for proper management of species and natural communities; and for designated trails.

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- (F) Intentional introduction of non-native or non-indigenous plant and animal species is prohibited; except for the management of species and natural communities associated with this document with prior written approval of Holder.
- (G) There shall be no collecting of plant material, animals, fossils, minerals, or artifacts, except as mutually authorized by Grantor and Holder for scientific and nature study and in accordance with applicable State and Federal laws.
- (H) There shall be no application of pesticides, herbicides, insecticides, or other chemicals to the Property, except as may be reasonably necessary for control of invasive species which threaten the natural character of the area, for control of pestiferous species or for control of human disease-carrying species. If the natural balance of the area is seriously upset, control measures may be employed that are compatible with the maintenance of the natural features, and then only with express written permission of Holder. Holder's approval may be withheld only upon a reasonable determination by Holder that the action as proposed would be inconsistent with the purpose of this Environmental Covenant.
- (I) No other acts, uses or discharges shall be allowed which adversely affect fish or wildlife habitat or the preservation of land or water areas on the Property.
- (J) Any other use of the Property or activity, which would materially impair the Conservation Values, unless necessary for the protection of the Conservation Values that are the subject of this Environmental Covenant, are prohibited.

3. PERMITTED USES

Without limiting the generality of all rights inuring to or reserved by Grantor, Grantor shall be permitted to do any and all of the following, subject to the limitations contained herein:

- (A) Grantor may, but has no obligation to, restore and enhance features or any ecological system, including reforestation, with the approval of the Holder.
- (B) Grantor has an existing cabin and boat dock which he may maintain.
- (C) Grantor may build a wooden boardwalk of no more than 36 inches in width to access wetlands within the Property. Boardwalk may extend approximately 500 ft. in a southwesterly direction across existing marsh beginning at the northwest corner of the existing cabin to a point on the property immediately abutting the Mispillion River.
- (D) Grantor and Grantor's invitees have the right, but not the obligation, to hunt, trap and fish the Property in accordance with applicable State and Federal hunting, trapping and fishing laws.

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4. LIMITATIONS ON THE USE OF ENVIRONMENTAL COVENANT AREA FOR THE PURPOSES OF BUILDING DENSITY REQUIREMENTS.

No portion of the Property may be used to satisfy land area requirements for the calculation of building density under zoning or subdivision laws, regulations, or ordinances for any lands adjacent to the Property.

5. RESERVED RIGHTS

Grantor reserves to itself, its personal representatives, heirs, successors and assigns, all rights accruing from its ownership of the Property, including the right to engage in or permit or invite others to engage in all uses of the Property that are not expressly prohibited herein and are not inconsistent with the purposes of this Environmental Covenant. Holder does not assume any responsibilities, costs, or liabilities of any kind related to the ownership of the land included in the Property. Grantor assumes no obligation under this Environmental Covenant to care for or maintain the Property, or to enforce the terms of this Environmental Covenant except as to its own acts or omissions and those of its agents, employees, representatives, contractors, or invitees.

6. GRANTOR'S DUTY TO NOTIFY

Grantor, prior to performing or permitting any activity described in this Environmental Covenant which requires prior approval of Holder, hereby agrees to submit to Holder for review and approval, the required information in writing thirty (30) calendar days prior to the date Grantor intends to undertake the activity in question. Holder shall grant or withhold its approval in writing as soon as practicable, but in all cases, within thirty (30) calendar days of receipt of Grantor's written request, and Holder's failure to respond within thirty (30) calendar days shall be deemed an approval. Holder's approval may be withheld only upon a reasonable determination by Holder that the action as proposed would be inconsistent with the terms of this Environmental Covenant.

7. NOTICES

Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and either served personally or sent by first class mail, postage prepaid and addressed as follows:

Grantor: Sharon L. and William R. Pike, Jr.
6661 Shawnee Road
Milford, DE 19963

Holder: Department of Natural Resources & Environmental Control
Division of Parks & Recreation
89 Kings Highway
Dover, Delaware 19901
Attention: Land Preservation Office

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Third Party with Right of Enforcement:

Rachel Jacobson
U.S. Department of Justice
Environment and Natural Resources Division
1425 New York Avenue, N.W.
P.O. Box 7611
Washington, D.C. 20044

Upon written notice from a party, or a successor in interest, to the other party hereto, any such notice, demand or other written communication shall be given to that party or successor at the address indicated in such notice.

8. ENFORCEMENT AND OTHER RIGHTS OF HOLDER

(A) To accomplish the purpose of this Environmental Covenant, the following rights are conveyed to Holder by this Environmental Covenant:

- (i) To preserve and protect Conservation Values of the Property;
- (ii) To enter upon the Property from time to time, by routes approved by the Grantor, at a day and time mutually agreeable to Grantor and Holder, such day and time not to exceed fifteen (15) calendar days from written notice by Holder to Grantor, for the purpose of (1) monitoring Grantor's compliance herewith and otherwise enforcing the terms of this Environmental Covenant; (2) biological monitoring, and (3) controlling invasive species; provided that such entry shall not unreasonably interfere with Grantor's use and quiet enjoyment of the Property. Holder's enforcement monitoring shall include at a minimum an annual inspection; and
- (iii) To prevent any activity on or use of the Property that is inconsistent with the purpose of this Environmental Covenant and to require the restoration of such areas or features of the Property that may be damaged by any activity inconsistent with this document, pursuant to this Paragraph.

(B) In the event that a violation of the terms of this Environmental Covenant by Grantor comes to the attention of Holder, Holder shall give written notice to Grantor of such violation and demand corrective action sufficient to cure the violation and restore the portion of the Property so injured. If the violation is not cured within thirty (30) calendar days of the receipt of written notice from Holder, or where the required corrective action cannot be completed within thirty (30) calendar days, Grantor fails to commence such cure within said thirty (30) calendar day period and fails to continue diligently to cure the violation until finally cured, then Holder may bring an action at law or in equity in a court of competent jurisdiction to enforce

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the terms of this Environmental Covenant, to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction, to recover any damages to which it may be entitled for violations of the terms of this Environmental Covenant, including damages for the loss of Conservation Values, and to require the restoration of the Property to its prior condition. Grantor shall not be liable or responsible for the acts or omissions of third parties; provided, however, that the third party is not an agent, contractor, employee, representative, or invitee of the Grantor.

- (C) In the event that a violation of the terms of this Environmental Covenant by a third party comes to the attention of Holder, Holder shall give written notice to said third party, with a copy of notice sent to Grantor, of such violation and demand corrective action sufficient to cure the violation and restore the portion of the Property so injured. If the violation is not cured by said third party within thirty (30) calendar days of the receipt of written notice from Holder, or, where the required corrective action cannot be completed within thirty (30) calendar days, said third party fails to commence such cure within said thirty (30) calendar day period and fails to continue diligently to cure the violation until finally cured, Holder may bring an action at law or in equity in a court of competent jurisdiction against said third party to enforce the terms of this Environmental Covenant, to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction, to recover any damages to which it may be entitled for violations of the terms of this Environmental Covenant, including damages for the loss of Conservation Values, and to require the restoration of the Property to its prior condition.
- (D) If Holder determines that circumstances require immediate action to prevent or mitigate irreparable harm to the Conservation Values of the Property, Holder shall attempt to contact Grantor immediately to notify Grantor of said situation and, upon permission from Grantor, proceed to enforce its rights under this Environmental Covenant. If Holder is unable to contact Grantor after a good faith effort, then Holder may pursue its rights under this Section and provide Grantor written justification for such action as soon as possible.
- (E) If monetary damages for any violation of the terms of this Environmental Covenant are inadequate, Grantor or Holder shall be entitled to the injunctive relief described in this Section 8, both prohibitive and mandatory, in addition to such other relief to which either party may be entitled, including specific performance of the terms of this Environmental Covenant. Actual damages or the inadequacy of otherwise available legal remedies need not be proven for Grantor or Holder to obtain the relief described in this Paragraph.
- (F) All reasonable costs incurred by a party in enforcing the terms of this Environmental Covenant, including costs of suit and attorneys fees, and any

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reasonable costs of restoration necessitated by the violation of this Environmental Covenant, shall be borne by the violator

- (G) Grantor's and Holder's rights under this Section apply equally in the event of either actual or threatened violations of the terms of this Environmental Covenant.
- (H) Nothing contained herein shall be construed to entitle Holder to bring any action against Grantor for any injury to or change in the Property resulting from causes beyond Grantor's control including, without limitation, fire, flood, storm, and earth movement, or from prudent action taken by Grantor under emergency conditions to prevent, abate or mitigate significant injury to the Property resulting from such causes.

9. THIRD PARTY RIGHT OF ENFORCEMENT

The United States of America is an intended third party beneficiary of this Environmental Covenant and is hereby granted third party right of enforcement. As such, the United States may exercise all of the rights and remedies provided to the Holder herein, and is entitled to all of the indemnifications provided to the Holder in this Environmental Covenant. The United States and the Holder each have independent authority to enforce the terms of this Environmental Covenant; provided, however, that the United States expects that the Holder shall have primary responsibility for monitoring and enforcement of the Environmental Covenant. In the event that the United States and the Holder do not agree as to whether the Grantor is complying with the terms of the Environmental Covenant, the United States and the Holder may proceed with enforcement actions without the consent of the other.

10. LIMITATIONS ON PUBLIC ACCESS

The grant of this Environmental Covenant in no way grants the general public the right to enter any portion of the Property for any purpose; except for such activities as may be mutually permitted by Grantor and Holder and determined by both of them to be consistent with the purposes of this document.

11. HOLD HARMLESS

Grantor hereby releases and agrees to hold harmless, indemnify and defend Holder and its Secretary, employees, agents and contractors and its personal representatives, successors and assigns of each of them (collectively "indemnified Parties") from and against all liabilities, penalties, fines, charges, costs, losses, damages, expenses, causes of action, claims, demands, orders, judgments, or administrative actions, including, without limitation, reasonable attorneys' fees, arising from or in any way connected with injury to or death of any person, or physical damage to any Property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause, except to the extent due to the negligence or willful misconduct of any of the Indemnified Parties.

03250 2288

12. MODIFICATION

This grant is made by Grantor with the understanding that the Conservation Purposes for which it is given may be protected or furthered notwithstanding the possibility that circumstances may arise that would justify modification of certain specific terms of this Environmental Covenant. To that end, Grantor and Holder may agree in writing to modify the terms of this Environmental Covenant to the extent that such modification furthers or does not have an adverse effect on the Conservation Values to be protected by this grant, subject to any procedural requirements imposed upon Grantor or Holder by law. The United States shall be notified prior to any amendment or modification and given the opportunity to comment on or object to the amendment or modification. Any such amendment or modification to this Environmental Covenant shall be recorded in the official records of the county in which the Property is located.

13. EXTINGUISHMENT

If circumstances arise in the future such as to render the purpose of this Environmental Covenant impossible to accomplish, this Environmental Covenant may be terminated according to the laws of the State of Delaware. Grantor agrees that the grant of this Environmental Covenant gives rise to a Property right, immediately vested in Holder. If the Environmental Covenant is taken, in whole or in part, by exercise of the power of eminent domain or other action, Holder, as well as Grantor, shall be entitled to compensation in accordance with applicable law. Holder shall use its share of any net proceeds recovered in compensation for the taking of the Environmental Covenant for the protection or acquisition of interests in land for conservation purposes, which are exemplified by this grant.

14. TRANSFER OF GRANTOR'S INTEREST

Grantor agrees to record this Environmental Covenant with the appropriate office in Sussex and Kent Counties, Delaware. Grantor further agrees to give written notice to Holder of the transfer of any interest in the Property upon the date of such transfer.

15. TRANSFER OF HOLDER'S INTEREST

- (A) Holder shall not transfer this Environmental Covenant unless Holder, as a condition of the transfer, requires that the transferee continue to carry out the Conservation Purposes of this Environmental Covenant.
- (B) All transfers of this Environmental Covenant shall be restricted to organizations qualifying, at the time of transfer, as an eligible Holder under paragraph (c)(1) of Treasury Regulation Section 1.170A-14, as amended and replaced from time to time.
- (C) Holder shall give written notice to Grantor and the United States of the transfer of any interest at least thirty (30) calendar days prior to the date of such transfer. The failure of Holder to perform this condition shall not

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impair the validity of this Environmental Covenant or limit its enforceability in any way.

16. HOLDER'S DISCRETION

Enforcement of the terms of this Environmental Covenant shall be at the discretion of Holder, and any forbearance by Holder to exercise its rights under this Environmental Covenant in the event of any breach of any term of this Environmental Covenant by Grantor shall not be deemed or construed to be a waiver by Holder of such terms or of any subsequent breach of the same or any other terms of this Easement or of any of Holder's rights under this Easement. No delay or omission by Holder in the exercise of any right or remedy upon any breach by Grantor shall impair such right or remedy or be construed as a waiver.

17. ACKNOWLEDGMENTS

- (A) Grantor has received the Baseline Documentation and agrees not to contest the documentation contained therein.
- (B) Grantor attests that it is the owner of the Property and that, to Grantor's knowledge, the Property is not subject to a mortgage as of this date, or if the Property is subject to a mortgage then a release of lien and mortgage subordination has been signed and acknowledged prior to approval of this document.

18. DURATION OF EASEMENT

The parties agree that this Environmental Covenant shall run with the land in perpetuity (except if extinguished pursuant to Section 12 hereof) and is binding upon all subsequent owners of the Property, their heirs, executors, administrators, successors, devisees, and assigns, as the case may be, and is binding upon Holder's successors and assigns.

19. INTERPRETATION OF EASEMENT

This Environmental Covenant shall be construed in favor of the grant to effect the purpose of the Environmental Covenant and the policy and purpose of 7 Del. C. Chapter 79.

20. RECORDATION

This instrument shall be recorded in a timely fashion in the official records of the counties in which the Property is located.

21. SEVERABILITY

If any provision of this Environmental Covenant, or the application thereof to any person or circumstance, is found to be invalid, the remainder of the provisions of this Environmental Covenant, or the application of such provision to persons or circumstances other than those as to which it is found to be invalid, as the case may be, shall not be affected thereby.

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22. NO FORFEITURE

Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

23. TERMINATION OF RIGHTS AND OBLIGATIONS

A party's rights and obligations under this Environmental Covenant terminate upon transfer of the party's interest in the Environmental Covenant or Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

24. BINDING EFFECT

This Environmental Covenant and all the rights, duties, obligations and liabilities hereunder shall be a "covenant running with the land" and shall be binding upon the Property and all successive owners of the Property (unless extinguished pursuant to Section 12 hereof) provided, however, that if the Grantor should transfer ownership or any interest in this Property (whether legal, equitable or beneficial) then the Grantor shall be released from all further duties, obligations and liabilities hereunder and the Grantor's successor in title (or other interest) shall assume all of Grantor's duties obligations and liabilities hereunder.

25. CAPTIONS

The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

26. COUNTERPARTS

This instrument may be executed in one or more counterparts, which, when executed and taken together, shall be deemed to be a complete and integrated document.

27. REMEDIATION ADMINISTRATIVE RECORD

Pursuant to Title 7, Del. Code Chapter 79 Subtitle II, locations of the administrative record governing previous remediation of the E.I. DuPont De Nemours Site (Newport Landfill) can be found at:

Kirkwood Library
6000 Kirkwood Highway
Wilmington, DE 19801

Newport Town Hall
15 N. Augustine St.
Newport, DE 19804

U.S. EPA
Administrative Records Room
841 Chestnut Building
Philadelphia, PA 19107

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TO HAVE AND TO HOLD unto Holder, its successors and assigns forever.

IN WITNESS WHEREOF, Grantor and Holder have set their Hands and Seals the day and year above first written.

Grantor:

William R. Pike Jr.

William R. Pike, Jr.

William R. Pike Jr.

William Robert Pike, Jr.

Sharon L. Pike

Sharon L. Pike

Sharon L. Pike

Sharon Lee Pike

Holder:

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

By: John A. Nichols

Title: Secretary

503250 2292

STATE OF DELAWARE)
)
 SS.
COUNTY OF Kent)

BE IT REMEMBERED, that on this 19th day of December, 2005, personally came before me, the Subscriber, a Notary Public in and for the State and County aforesaid, William R. Pike, Jr., a.k.a. William Robert Pike, Jr. and Sharon L Pike, a.k.a. Sharon Lee Pike, parties to this Instrument, known to me personally to be such, and acknowledged this Indenture to be their act and deed for the purposes set forth herein.

GIVEN under my Hand and Seal of Office, the day and year aforesaid.

CASIER ANTHONY
Notary Public, State of Delaware
My Commission Expires September 20, 2007

Casie R Anthony
NOTARY PUBLIC
Notary: Print Name and
Date Commission Expires

STATE OF DELAWARE)
)
 SS.
COUNTY OF Kent)

BE IT REMEMBERED, that on this 19th day of December, 2005, personally came before me, the Subscriber, a Notary Public in and for the State and County aforesaid John A. Hughes, on behalf of The State of Delaware Department of Natural Resources and Environmental Control, a party to this Instrument, known to me personally to be such, and acknowledged this Indenture to be his/her act and deed and the duly authorized act and deed of said agency.

GIVEN under my Hand and Seal of Office, the day and year aforesaid.

CASIER ANTHONY
Notary Public, State of Delaware
My Commission Expires September 20, 2007
Notary: Print Name and
Date Commission Expires

503250 2293

METES AND BOUNDS DESCRIPTION
PROPERTY OF
WILLIAM ROBERT PIKE, JR. AND SHARON LEE PIKE
KENT COUNTY, DELAWARE

BEGINNING for the same at a point at the intersection of the east bank of the New Mispillion River and the south bank of the Old Mispillion River, Said point being South 07 degrees 33 minutes 06 seconds East 140.76 feet, as now surveyed, from the beginning of the 7th or North 19 degree 52 minute 08 second East 665.75 foot line as described in the 2nd parcel of a deed from William R. Pike, Jr. to William R. Pike, Jr. and Sharon L. Pike in a deed dated August 27, 1993 and recorded among the land records of Sussex County, Delaware in Book 1993 at page 19; thence running with the north bank of the Old Mispillion River, as now surveyed,

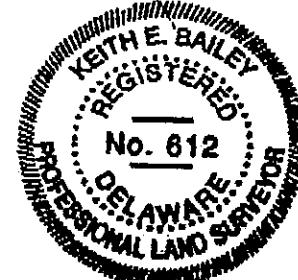
1. South 72 degrees 26 minutes 18 seconds East 88.52 feet to a point; thence
2. 400.25 feet along the arc of a curve to the right having a radius of 935.22 feet and being subtended by a chord bearing and distance of South 60 degrees 10 minutes 41 seconds East 397.20 feet to a point; thence
3. South 47 degrees 55 minutes 03 seconds East 30.00 feet to a point; thence
4. South 35 degrees 25 minutes 11 seconds East 231.26 feet to a point; thence
5. South 21 degrees 42 minutes 11 seconds East 86.08 feet to a point; thence
6. South 37 degrees 04 minutes 31 seconds East 62.00 feet to a point; thence
7. South 14 degrees 32 minutes 51 seconds East 137.84 feet to a point; thence
8. South 07 degrees 39 minutes 32 seconds East 30.00 feet to a point; thence
9. 158.08 feet along the arc of a curve to the right having a radius of 795.30 feet and being subtended by a chord bearing and distance of chord bearing South 01 degrees 57 minutes 52 seconds East 157.82 feet to a point; thence
10. South 03 degrees 43 minutes 48 seconds West 58.26 feet to a point; thence
11. South 23 degrees 45 minutes 07 seconds West 142.82 feet to a point; thence
12. South 38 degrees 31 minutes 57 seconds West 194.94 feet to a point; thence
13. South 51 degrees 29 minutes 13 seconds West 204.24 feet to a point; thence
14. South 75 degrees 11 minutes 50 seconds West 114.95 feet to a point; thence

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15. South 88 degrees 08 minutes 56 seconds West 103.89 feet to a point; thence
16. North 71 degrees 43 minutes 52 seconds West 241.65 feet to a point; thence
17. South 10 degrees 12 minutes 02 seconds West 34.34 feet to a point; thence
18. South 67 degrees 55 minutes 33 seconds West 113.69 feet to a point; thence
19. North 89 degrees 45 minutes 04 seconds West 144.75 feet to a point; thence
20. North 59 degrees 42 minutes 12 seconds West 44.99 feet to a point at the intersection of the north bank of the Old Mispillion River with the east bank of the New Mispillion River; thence with the east bank of the New Mispillion River, as now surveyed
21. North 20 degrees 33 minutes 06 seconds East 894.44 feet to a point; thence
22. North 07 degrees 33 minutes 06 seconds East 528.91 feet to the point of beginning.

Containing 949,261 square feet or 21.7920 acres of land, more or less.

Being all of that parcel of ground conveyed from John E. Carpenter to William Robert Pike, Jr. and Sharon Lee Pike as described in a deed dated December 29, 2000 and recorded among the land records of Kent County, Delaware in Deed Record 396, Page 283.



Keith E. Bailey
10/13/05

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METES AND BOUNDS DESCRIPTION
PROPERTY OF
WILLIAM ROBERT PIKE, JR. AND SHARON LEE PIKE
SUSSEX COUNTY, DELAWARE

PARCEL 1

BEGINNING for the first at a concrete monument found at the beginning of the first or South 75 degree 23 minute 48 second West 524.95 foot line of Parcel 2 as described in a deed from William R. Pike, Jr. to William R. Pike, Jr. and Sharon L. Pike dated August 27, 1993 and recorded among the land records of Sussex County, Delaware in Book 1993 at page 19; thence binding on and running with said first line, as now surveyed,

1. South 62 degrees 25 minutes 19 seconds West 524.95 feet to a point; thence binding on the second, third, fourth, fifth, sixth, and seventh line of said deed, as now surveyed
2. South 64 degrees 44 minutes 04 seconds West 499.47 feet to a 14" twin white oak; thence
3. South 37 degrees 25 minutes 16 seconds East 330.23 feet to a 1" iron pipe found; thence
4. South 67 degrees 13 minutes 52 seconds West 364.75 feet to an 18" pine found on the north bank of the Old Mispillion River; thence generally along the northerly bank of the Old Mispillion River
5. North 45 degrees 00 minutes 30 seconds West 237.22 feet to a point; thence continuing along said bank
6. North 64 degrees 08 minutes 27 seconds West 462.08 feet to a point at the intersection of the northerly bank of the Old Mispillion River and the Easterly bank of the New Mispillion River; thence running generally along the Easterly bank of the New Mispillion River
7. North 07 degrees 33 minutes 06 seconds East 666.98 feet to a point; thence leaving said river and binding on the eighth or South 58 degree 55 minute 09 second East 968.24 foot line of the aforesaid deed from Pike to Pike, as now surveyed
8. South 71 degrees 17 minutes 27 seconds East 952.90 feet to and 1" iron pipe found at the end of said line; thence binding on the ninth or South 89 degree 25 minute 09 second 660 foot line of the aforesaid deed, as now surveyed

503250 296

9. North 78 degrees 12 minutes 33 seconds East 659.95 feet to the point of beginning

Containing 696,600 square feet or 15.992 acres of land, more or less

Being the same parcel of land as described as Parcel 2 in a deed dated August 27, 1993 from William R. Pike, Jr. to William R. Pike, Jr. and Sharon L. Pike and recorded among the land records of Sussex County, Delaware in Book 1993 at page 19.

PARCEL 2

BEGINNING for the second at a point on the westerly bank of the New Mispillion River, Said point being North 71 degrees 17 minutes 27 seconds West 203.86 feet from the beginning of the 8th or South 71 degree 17 minute 27 second East 952.90 foot line of the firstly described parcel herein; thence running with the westerly bank of the New Mispillion River, as now surveyed,

1. South 07 degrees 33 minutes 06 seconds West 241.45 feet to a point; thence leaving said New Mispillion River
2. North 33 degrees 52 minutes 18 seconds West 139.73 feet to a point; thence
3. North 41 degrees 37 minutes 42 seconds East 165.00 feet to the point of beginning.

Containing 11,161 square feet or 0.2562 of an acre of land, more or less.

Being the same parcel of land as described as Parcel 3 in a deed dated August 27, 1993 from William R. Pike, Jr. to William R. Pike, Jr. and Sharon L. Pike and recorded among the land records of Sussex County, Delaware in Book 1993 at page 19.



Keith E. Bailey
10/13/05

ATTACHMENT F
INFORMATION AND CONDITIONS KNOWN TO THE TRUSTEES

United States of America and the State of Delaware

v.

**E. I. du Pont de Nemours and Company &
Ciba Specialty Chemicals Corporation**

Consent Decree

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ATTACHMENT F

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ATTACHMENT G
SUMMARY OF COSTS

United States of America and the State of Delaware

v.

**E. I. du Pont de Nemours and Company &
Ciba Specialty Chemicals Corporation**

Consent Decree

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Past Costs (Cooperative Negotiations), Future Costs (Construction), Future Costs (Construction Contingency), Future Costs (Oversight of Construction), Post Costs (Maintenance)

Attachment G - Summary of Costs
DuPont Newport NRD at Pike Property

Phase of Work	Entity	Stage	Dollar Amount, to be Paid	Address	Dollar Amount, Paid	Note	To Be Completed / Completed	Date Required
Past Costs	NOAA	Cooperative Negotiations	\$173,127.30	Electronic Transfer DOJ No. 90-11-2-883/2			To be completed by DuPont	Within 120 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Past Costs	DOI USFWS	Cooperative Negotiations	\$98,898.00	Electronic Transfer DOJ No. 90-11-2-883/2			To be completed by DuPont	Within 120 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Past Costs	Delaware	Cooperative Negotiations	\$24,527.21	By Check, Delaware HSCA Account, DNREC SIRB			To be completed by DuPont	Within 120 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Past Costs	Delaware	Groundwater Injury	\$8,000.00	By Check, Delaware HSCA Account, DNREC SIRB			To be completed by DuPont	Within 120 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Past Costs	Delaware	Groundwater Injury	\$0.00	Previous Work Performed by DuPont for Delaware, by Check to DuPont Newport Account, USDOI, Restoration Funds Manager	\$586,000.00	As a credit from the Water Line installed by DuPont beyond the requirements of the ROD	Completed by DuPont	Done
Future Costs	DOI USFWS	Construction	\$559,629.00	by Check to DuPont Newport Account, USDOI, Restoration Funds Manager		Remaining Funds Post Completion of Construction of Restoration Project Certification to be reimbursed to DuPont	To be completed by DuPont	Within 30 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Future Costs	DOI USFWS	Construction Contingency	\$109,808.00	by Check to DuPont Newport Account, USDOI, Restoration Funds Manager		Remaining Funds Post Completion of Construction of Restoration Project Certification to be reimbursed to DuPont	To be completed by DuPont	Within 30 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Future Costs	DOI USFWS	Oversight of Construction	\$23,216.00	by Check to DuPont Newport Account, USDOI, Restoration Funds Manager		Remaining Funds Post Completion of Construction of Restoration Project Certification to be reimbursed to DuPont	To be completed by DuPont	Within 30 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Future Costs	NOAA	Oversight of Construction	\$10,000.00	By Check to DuPont Newport Account, USDOI, Restoration Funds Manager		Remaining Funds Post Completion of Construction of Restoration Project Certification to be reimbursed to DuPont	To be completed by DuPont	Within 30 days from Entry of the Consent Decree in US District Court for the District of Delaware, (Para. 20 of CD).
Future Costs	Delaware	Oversight of Construction	\$40,000.00	By Check, Delaware HSCA Account, Attn: DNREC SIRB, for DNREC FWS Use		Upon Certification by Trustees' that Construction of Restoration is Complete and Project is now the Responsibility of DNREC FWS	To be completed by DuPont	Within 60 days of the days after receipt of notice of certification by the Trustees that restoration is complete, (Para. 27, CD).
Post Costs	Delaware	Maintenance Costs	\$50,000.00					
Total		Summary	\$1,097,205.51		\$586,000.00			